DYNATRON SOLARIS®
700 SERIES

SERVICE MANUAL

CAUTION: Federal law restricts these devices for sale by or on the order of a physician, chiropractor, physical therapist, or dentist licensed by the law of the state in which said person practices to use or order the use of the devices.

Risk of burns and fire - Do not use near conductive materials such as metal bed parts, inner spring mattresses and the like.

DANGER - Explosion Hazard: Do not use in the presence of flammable anesthetics.

IMPORTANT: Before treating a patient with any Dynatron Solaris® Device, see the "Contraindications, Warnings, and Precautions" in this manual.

INDICATIONS FOR USE

ELECTROTHERAPY:

- Electrical muscle stimulation therapy (Russian, Biphasic, High Volt) for:
  1. relaxation of muscle spasm;
  2. prevention or retardation of disuse atrophy;
  3. increasing local blood circulation;
  4. muscle re-education;
  5. immediate post surgical stimulation of calf muscles to prevent venous thrombosis
  6. maintaining or increasing range of motion.
- Transcutaneous electrical nerve stimulation and Interferential Current Therapy (Interferential, Premodulated, High Volt, Microcurrent) for:
  Symptomatic relief of chronic intractable and/or management of post-traumatic or post-surgical pain.

DIRECT CURRENT THERAPY:
Direct Current is indicated for relaxation of muscle spasms.

ULTRASOUND THERAPY:
Ultrasound therapy is intended to generate deep heat within body tissues for the treatment of selected medical conditions such as relief of pain, muscle spasms, and joint contractures, but not for the treatment of malignancies.

LIGHT THERAPY:
Light therapy provides topical heating for temporary increase in blood circulation, temporary relief of minor muscle and joint aches, pain and stiffness, relaxation of muscles, and treatment of muscle spasms and minor pain and stiffness associated with arthritis.

The Solaris D890 laser product is designated as class 1M during all procedures of Operation and Maintenance.
AVOID INADVERTENT EXPOSURE TO POTENTIALLY HAZARDOUS LIGHT

ISO 13485:1996
KEMA CERTIFICATE
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PATENT PENDING
REV. 02-07_14
INVENTORY MKT299

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SECTION I
INTRODUCTION

Introduction to the Dynatron Solaris® 700 Series

The Dynatron Solaris 700 Series offers the practitioner a wide range of treatment options. These devices provide Interferential and Premodulated therapy; High Voltage pulsed stimulation; Russian and Biphasic therapies; Microcurrent and Direct Current treatments; and Infrared Light Probe applications. The Solaris 700 Series devices may, with the use of the Dynatron® Booster Box, operate the Dynatron® Xp™, a powerful 8"X10" Infrared Light Pad. In addition, the Solaris 701, 708, and 709 include Ultrasound and the Dynatronics Combo*plus*™ feature providing almost unlimited combinations of treatment options.

The 700 Series devices include the standard advantages of Dynatronics engineering, such as customizable treatments, electrode conductance meters and the popularTarget feature. In addition all units offer the option of battery operation, making the devices truly portable. The manufacturer's warranty for these devices is two years (see full warranty details at the back of this manual).

This manual provides operator information and instructions for five Solaris models: the 701, 705, 706, 708, and 709. The section that discusses Ultrasound and Combo*plus* treatments applies only to the Dynatron 701, 708 and 709 models. All other sections of this manual apply to all Dynatron Solaris devices.

Summary of Features by Device

Feature	701	709	708	706	705
Electrotherapy					
IFC		X	X	X	X
Premod		X	X	X	X
Biphasic		X	X	X	X
Russian		X	X	X	X
High Volt		X	X	X	X
Microcurrent		X	X	X	X
Direct Current		X	X	X	X
Combo Electrotherapy/Ultrasound		X	X		
Light Therapy	X	X	X	X	X
Ultrasound	X	X	X		
Special Features					
Electrotherapy Channels		4	2	4	2
High Volt Channel		1	1	1	1
Stim Probe Channel		X	X	X	X
Infrared/Laser Light Therapy Port	X	X	X	X	X
Conductance Meter		X	X	X	X
*Booster Box / Light Pad Capability	X	X	X	X	X

*Note: The Dynatron Solaris Booster Box must be used in conjunction with the Dynatron Xp Light pad on all Solaris 700 Series devices. Software upgrades are required on all devices manufactured prior to September 2005.

Simplified Setup

The unique design of the Solaris front panel means treatment setup has never been easier. A few simple key presses are all you need to fully set up a treatment. The careful grouping of available options for each modality ensures that you can easily see and select from the appropriate options for that modality.

Each modality offers default settings which are automatically preset when the modality is selected—saving time in the treatment setup. You can change these defaults to match your own most common treatment setups reducing setup time to a matter of seconds.

Before You Treat a Patient

Before administering a treatment to a patient with the Solaris devices, you should familiarize yourself with all the operating instructions for the modality used, as well as the contraindications, warnings, and precautions for that modality.

You should also read the general information about each of the modalities provided in this manual. In addition to this information, consult other published sources for additional application and safety instructions regarding use of each type of therapy.

Installation and Features

Unpacking

When you receive the unit, immediately unpack it and all accessories and check for possible damage, obvious or concealed. In case of damage, immediately notify the freight carrier and take any steps necessary to file a claim for the damage sustained. Do not destroy or discard the shipping carton. The carton should be reused if the device must be shipped for any reason. The carton is specially designed to protect the unit from shipping damage. Improper packaging of the unit during transport can result in damage and invalidate the warranty.

Complete the warranty registration form located at the back of this manual and return it to Dynatronics within 30 days of purchase. This is essential to insure you are not billed for services that are covered by the warranty policy. Warranty registration should include serial numbers for both the device and soundheads.

Connect the AC power cord, which is equipped with a hospital grade, UL listed plug, to a properly grounded 110/120V 60 Hz AC outlet (the device will automatically switch to 220/240V 50 Hz when connected to a power source with that voltage). The power cord must also be firmly plugged into the device itself. When the cord is properly connected, it can not be easily pulled out. Do not place the cord or the device in a place where the cord could be tripped over or accidentally pulled out of its socket during a treatment.

If Infrared Light Therapy probes or pads are being used in conjunction with a Solaris device and/or Booster Box, they should be plugged into the Solaris console and/or Booster Box prior to powering-on the device(s).

Read the operating instructions in this manual before proceeding with a treatment.

Standard Components

The following accessories are included with the Solaris units:

Qty	Part No.	Description
		One of the following devices:
1	D701	Solaris 701
1	D705	Solaris 705
1	D706	Solaris 706
1	D708	Solaris 708
1	D709	Solaris 709
1	7B0241	Power Cord (black)
1	9G0011	Operator's Manual
1	7B0268	Protocol Reference Manual for Electrotherapy & Ultrasound (Guffey, 2003)
1	7B0217	Dynagel Ultrasound Gel 100 ml sample - Solaris 701, 708 and 709 only

Note: The following are not applicable to the D701.

Qty	Part No.	Description
2	7B0232	120” double leads (2 red) - Solaris 706 and 709 only
2	7B0233	120” double leads (2 black) - Solaris 706 and 709 only
1	7B0230	72” double lead (1 red) - Solaris 705 and 708 only
1	7B0231	72” double lead (1 black) - Solaris 705 and 708 only
1	7B0234	COMBO*plus* lead wires –Solaris 708 and 709 only
1	7B0265	Ultra Polys™ Self-adhesive electrodes 2” x 4” w/pin connector (pkg. of 4)
1	8E0017A	MultiStim Point Tip Attachment
1	7B0250	MultiStim probe (requires one or more applicators)
1	8E0018	High Volt applicator 5/8” round
1	8E0019	High Volt applicator 2”x1-1/2”
2	7B0063	3” round carbon electrodes (2 red)
2	7B0065	3” round carbon electrodes (2 black)
4	7B0210	Sponge fabric for use with 3” carbon electrodes
1	7B0193	Sponge Pocket 1 1/2” x 2”
1	7B0192	Sponge Pocket 5/8”
2	DW248	2.5” x 48” straps (pkg. of 2) Solaris 706 and 709 only
1	DW248	2.5” x 48” straps (pkg. of 2) Solaris 705 and 708 only
1	7B0191	5” x 8” dispersive electrode for High Volt (gray)
1	7B0201	Sponge Fabric for use with 5”x 8” dispersive electrodes
1	8D0027	Microcurrent Ground Probe
1	7B0079	Banana-to-Pin Adapter (black)

Soundheads

The Solaris devices may be purchased with one or more applicator soundheads in the following sizes:

Part No.	Size	Frequencies
9GSH02	2 cm^2	Operates at 1, 2, and 3 MHz
9GSH05	5 cm^2	Operates at 1, 2, and 3 MHz
9GSH10	10 cm^2	Operates at 1, 2, and 3 MHz

Optional Accessories

The following optional and replacement accessories may be purchased from Dynatronics or from your Dynatronics dealer:

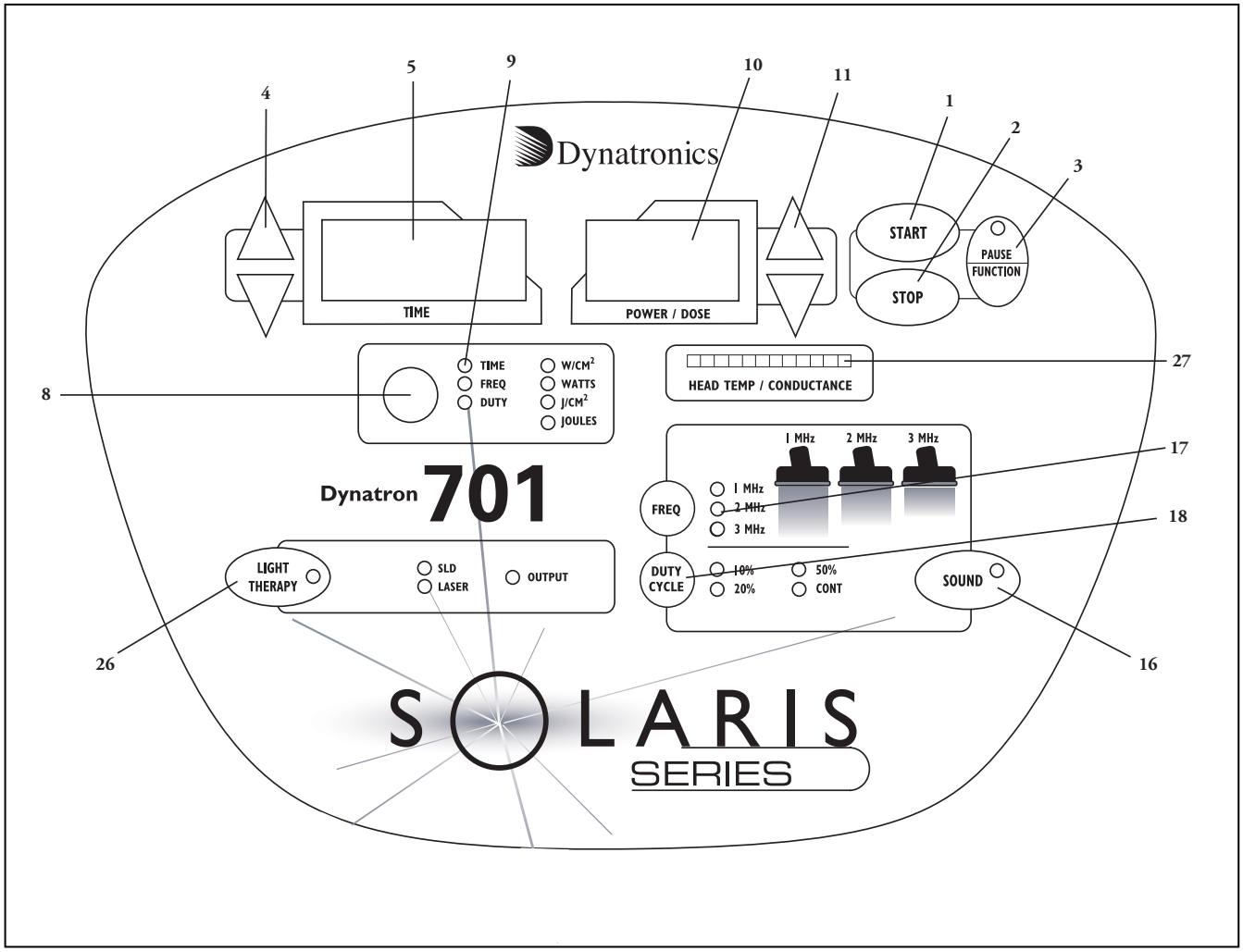
Part No.	Description
D880	Dynatron 880 Cluster Probe
D890	Dynatron 890 Light Therapy Probe
D405	Dynatron 405 Infrared Cluster Probe
D881	Dynatron 880*Plus* Infrared Cluster Probe
9G0104	Protective Eyewear (D405)
Xp	Dynatron Xp Infrared Light Pad (Booster Box required)
XpB	Dynatron Solaris Booster Box
7B0271	Light Therapy Applications Manual (Enwemeka & Pöntinen)
7B0272	Hard Side Carrying Case for Solaris Units
7B0273	Soft Side Carrying Case
7B0208	2” diameter carbon electrodes (red)
7B0209	2” diameter carbon electrodes (gray)
7B0063	3” diameter carbon electrodes (red)

Part No.	Description
7B0065	3” diameter carbon electrodes (gray)
7B0059	3” x 5” carbon electrodes (red)
7B0061	3” x 5” carbon electrodes (gray)
7B0067	1.5” x 2.0” carbon electrodes (red)
7B0069	1.5” x 2.0” carbon electrodes (gray)
7B0260	2” x 4” Ultra Polys™ adhesive electrodes (with snap or pin connector)
7B0261	2” x 2” Ultra Polys™ square adhesive electrodes (with snap or pin connector)
7B0077	Bifurcated extension lead wire for High Volt use
7B0082	Pin-to-Banana adapter (black)
7B0079	Banana-to-Pin Adapter (black)
7B0001	Snap adapter
5LTRGEL	Ultrasound Coupling Gel (5 liter container)
9G0079	Light Probe Covers (Disposable / 25 per package)
8A0061	Remote Stop Cable Assembly (Applicable only to customized, special order units).

Dynatron Solaris® Physical Features

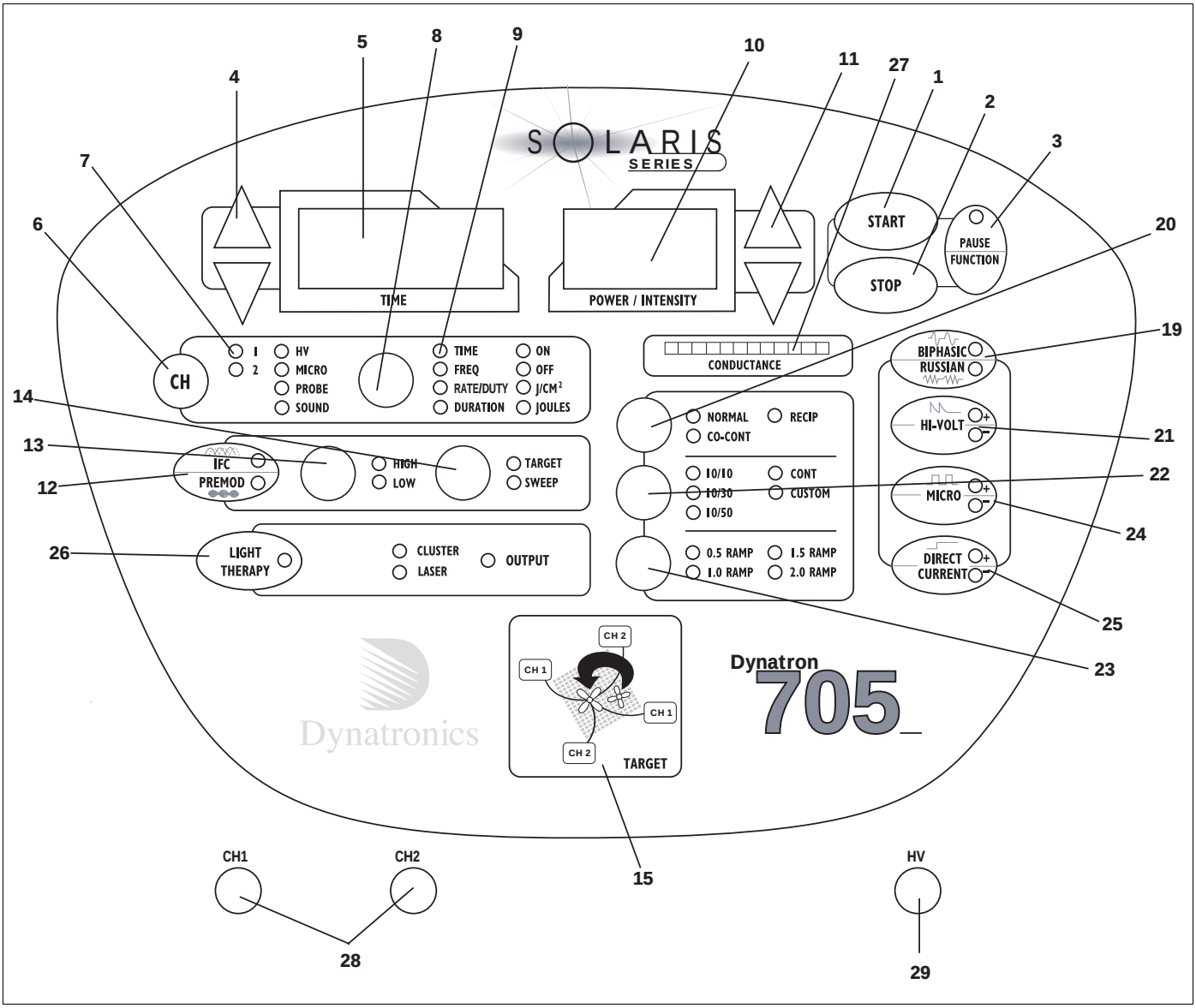
Before operating the Dynatron Solaris devices, acquaint yourself with the control panel by reviewing the illustrations and descriptions on the following pages. The numbered features in the diagrams correspond to the numbered descriptions. Before administering treatment to a patient, read the sections later in this manual that provide specific instructions for performing treatments, discussions of each modality, definitions of the available options, along with contraindications, warnings, and precautions for all modalities. Note that some options use “toggle” keys for making selections. More specific instructions for using toggle keys are provided later in this section.

Solaris 701



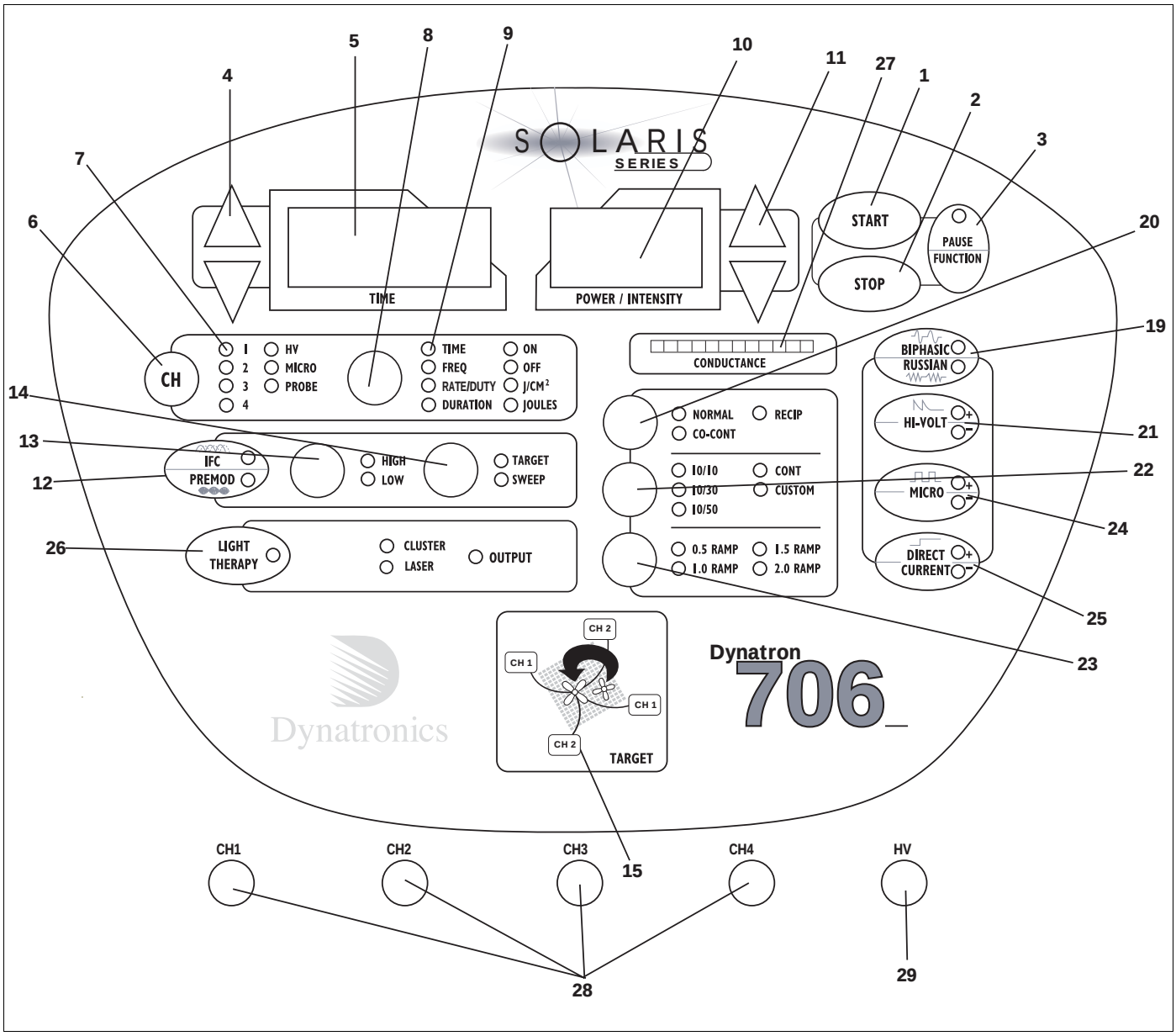
Dynatron Solaris 701 Control Panel

Solaris 705



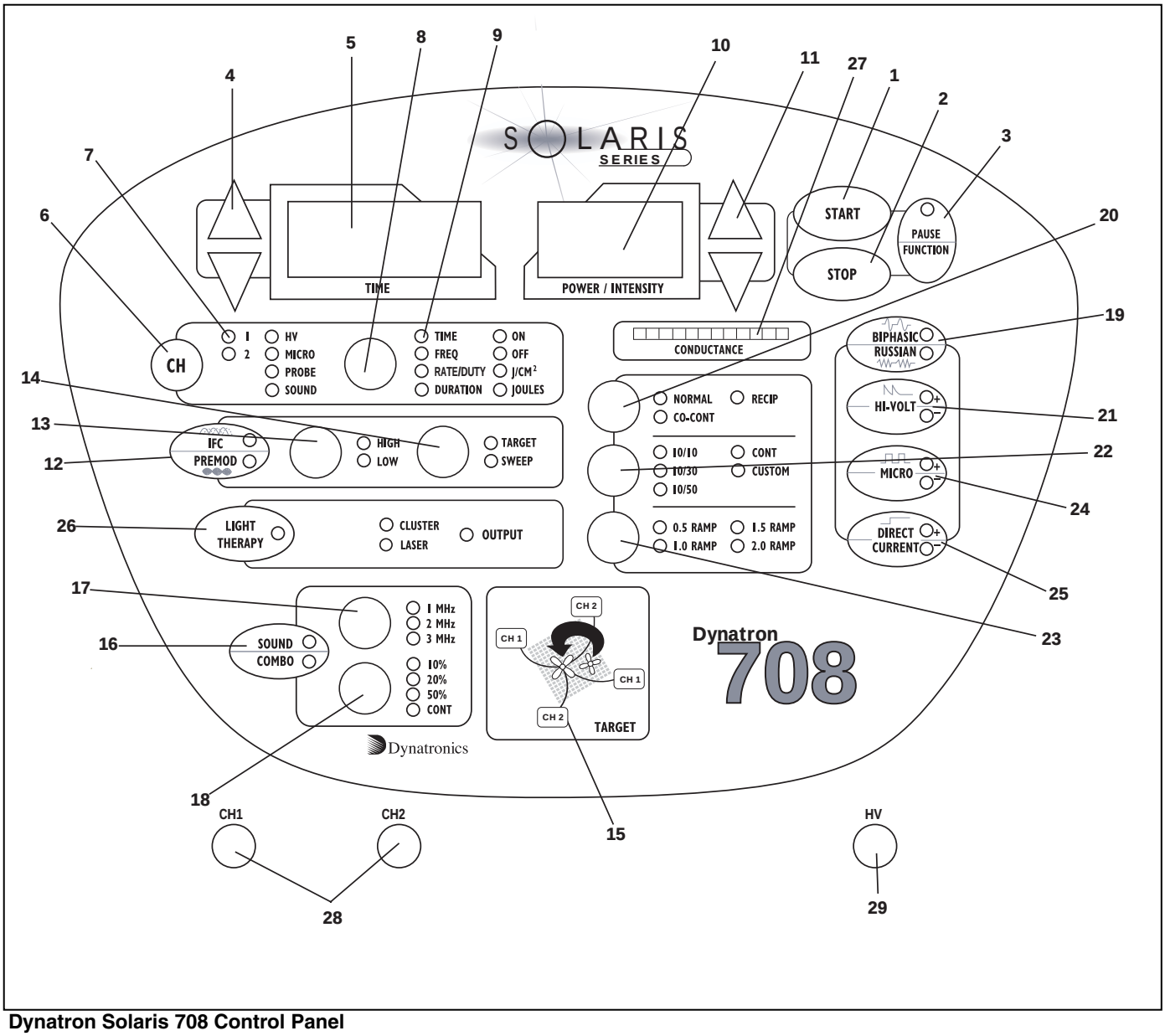
Dynatron Solaris 705 Control Panel

Solaris 706



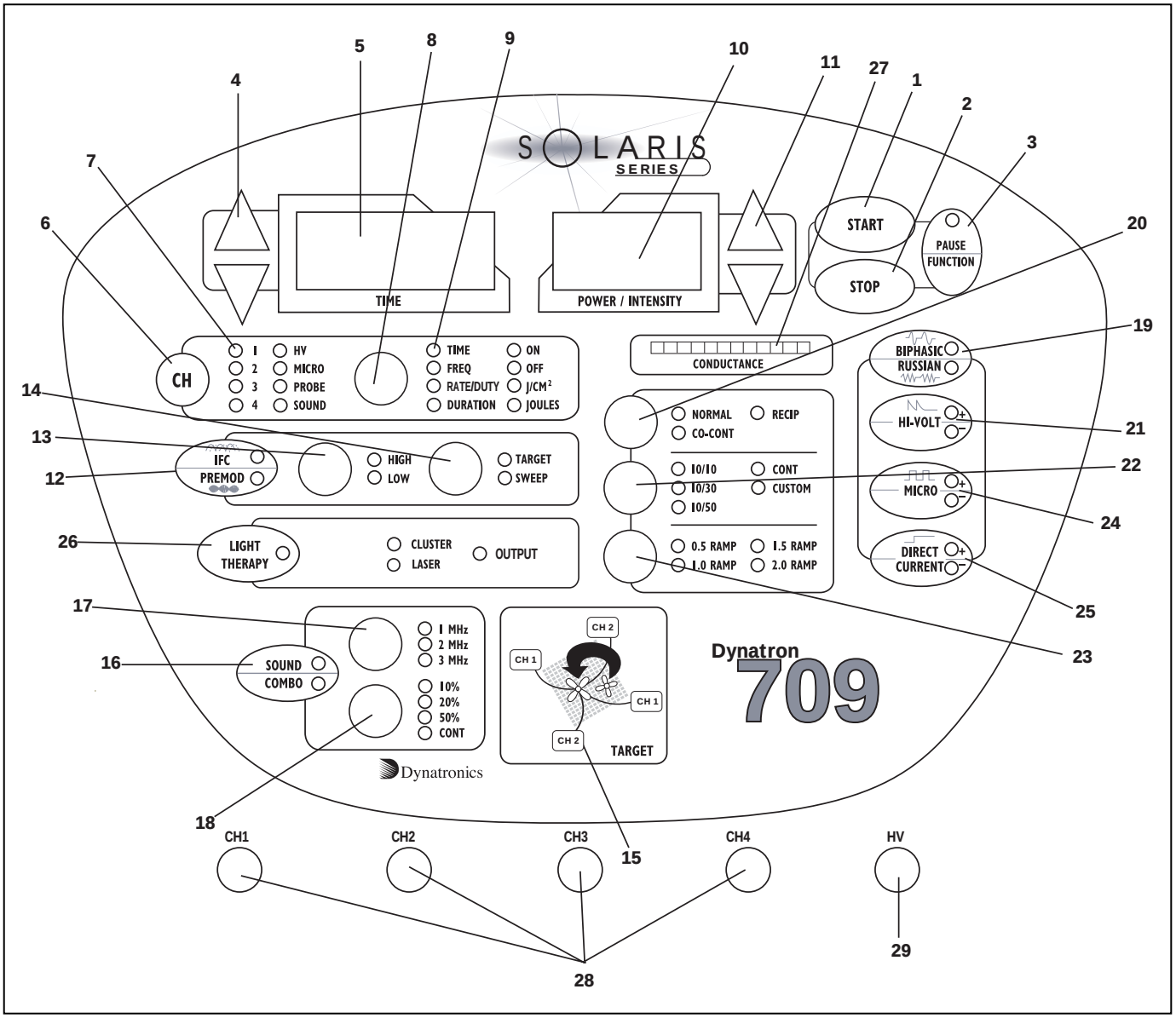
Dynatron Solaris 706 Control Panel

Solaris 708



Dynatron Solaris 708 Control Panel

Solaris 709



Dynatron Solaris 709 Control Panel

General Selections

1. START: Press this key to start the treatment timer and treatment proceeds as set up. For probe treatments, the START key only activates the probe in preparation for the treatment. The treatment begins after the 1/0 (ON/OFF) key on the probe handle is pressed.

2. STOP: Pressing this key during a treatment IMMEDIATELY stops the output and sets the treatment time to zero for all modalities. To stop just one treatment only, press and hold the FUNCTION key while you press the STOP key, or simply reduce that channel's treatment time to zero. For Light Probe treatments, press the 1/0 (ON/OFF) key located on the probe handle. On custom devices equipped with the remote stop feature, treatments may also be stopped by pressing the button on the REMOTE STOP cable, terminating all treatments.

3. PAUSE/FUNCTION: This key is used in combination with other key presses for accessing unique features including: Select polarity (High Volt, Microcurrent and Direct Current), audio volume control (Microcurrent), and to stop one treatment. Specific instructions for using this key are provided later in this manual.

   Ultrasound: For Dynatron Solaris 701, 708 and 709 only: This key is also used to PAUSE an Ultrasound treatment. For the Solaris 708 and 709, first press the CHANNEL TOGGLE (CH) to select SOUND. For the D701, press the SOUND key. With Ultrasound as the focus, press PAUSE/FUNCTION; the Ultrasound output is stopped, the treatment time is paused, and the light on the PAUSE key is lighted. When this key is pressed again, the Ultrasound treatment countdown resumes and the light on the PAUSE key is off.

   Combination Treatment: During a COMBO treatment, only the Ultrasound output and the treatment timer are stopped when you press PAUSE; the stim output continues.

   Infrared Light Therapy Probe/Pad: Pressing the PAUSE/FUNCTION key will not pause a Solaris Light Therapy Probe treatment that is in progress. A Light Therapy Probe Treatment is paused by pressing the "1/0" key on the Light Probe handle. However, pressing the PAUSE/FUNCTION key will pause a pad treatment.

   Please note: Following the completion of either a Pad or Probe treatment when using the Dynatron Booster Box, the practitioner must press the PAUSE/FUNCTION-STOP keys to exit the current focus (pad or probe) and switch to the opposite Light Therapy mode (pad or probe). For example: If the Booster Box is operational, and an Infrared Probe treatment has just timed out, the practitioner must press PAUSE/FUNCTION-STOP before using the CH toggle key to switch to an Infrared Light Pad treatment. PAUSE/FUNCTION-STOP would also have to be pressed following the Pad treatment to return back to a Probe treatment mode.

4. TIME ARROW KEYS: These UP/DOWN arrow keys are used to increase/decrease the treatment time or other parameters that are displayed in the TIME display.

5. TIME DISPLAY: This display is used to show the treatment time for one treatment at a time; the display shows treatment time for the selected channel (the selected channel is indicated by the GREEN LED—all other channels in use at the time will have YELLOW LEDs). The TIME display can also show the pulse rate and duration for Russian and Biphasic treatments as well as the frequencies for Interferential, Premodulated, and Microcurrent treatments, pulse duration for Direct Current treatments, and the pulse rate for High Volt. The treatment parameters for any treatment in progress may be displayed

at any time by first using the CHANNEL TOGGLE key to choose the desired channel (the D701 will always automatically default to show the active modality), then using the TIME TOGGLE key to select the desired parameter (Time, Freq, Rate, Rate/Duty, Duration, On/Off).

6. CHANNEL TOGGLE KEY (CH): When a treatment is in progress, you can press this key to choose an output channel and display the parameters for the treatment being delivered by that channel. When an output light is GREEN, the displays show the settings for that output. The available options depend on the modality selected. When two or more treatments are in progress simultaneously, the TOGGLE KEY is used to select the output or channel you wish to view.

7. CHANNEL SELECTIONS: These lights indicate which output channels are currently in use. A solid GREEN light indicates current is being delivered to that channel; the time, intensity and other treatment parameters for that channel are also displayed. A solid YELLOW light indicates a channel is in use and delivering current, but the time, intensity, and treatment parameters are not displayed at this time (only one channel's time and intensity may be displayed at a time). Flashing GREEN or flashing YELLOW indicates the OFF segment of a Biphasic, Russian, or High Volt treatment cycle. The channel's intensity and other treatment parameters may only be modified when it has a GREEN indicator light. Press the CHANNEL TOGGLE key (CH) to select a channel to be viewed.

8. TIME TOGGLE KEY: Press this key to display various treatment parameters in the TIME display including Time (treatment time), Freq (frequency), Rate/Duty (pulse rate), Duration (pulse width), ON and OFF (current on/off cycle). Available options during a given treatment or treatment setup depend on the modality selected.

9. TIME GROUP SELECTIONS: These LEDs indicate the parameters that are displayed (one at a time) in the TIME display. The default selection is the treatment time. Press the TIME TOGGLE key to select the desired option (available options depend on the modality selected). When a parameter is selected, its indicator light is GREEN, its value is displayed in the TIME display above, and the TIME arrow keys may be used to change the value. The device returns to the TIME display after 10 seconds with no key presses.

10. POWER/INTENSITY DISPLAY (D701 POWER/DOSE DISPLAY): This window shows the treatment output in watts/cm^2 or watts for Ultrasound, µA for Microcurrent and mA Direct Current, volts for High Volt and J/cm^2 or Joules for Light therapy. For all other modalities it displays intensity from 0-99 in respect to the currently selected channel (the selected channel is indicated by the GREEN LED. All other channels in use at the time will have YELLOW LEDs). Press the CHANNEL TOGGLE key to select the desired channel to be viewed. The D701 will default to the active modality.

11. POWER/INTENSITY ARROW KEYS: These arrow keys are used to increase/decrease the intensity or power of one treatment. Changes made to power and intensity affect only the currently selected channel (the selected channel is indicated by the GREEN LED—all other channels in use at the time will have YELLOW LEDs). Press the CHANNEL TOGGLE key to select the desired output channel. The D701 will default to the active modality. The arrow keys may then be used to change the intensity or power for that channel.

Interferential (IFC) / Premodulated Interferential (Premod) Selections:

12. IFC/PREMOD: Press this key once to begin setup of an Interferential treatment (the IFC LED is lighted); press this key twice to begin setup of a Premodulated treatment (the Premod LED is lighted). When you select IFC, a channel pair (CH1-2 or CH3-4) is automatically selected and the GREEN LED lights for the two auto-selected channels will be lighted. Connect two leads to the output jacks for the channels that are selected. When you select PREMOD, a single channel (1, 2, 3, or 4) is automatically selected and that channel's GREEN LED will be lighted. Connect one lead to the output jack that corresponds to the channel indicated by the GREEN LED. Note: Channel 3-4 are only found on the Solaris 706 and 709 devices.

13. HIGH/LOW TOGGLE (used with Interferential, Premodulated and High Volt): Press this key one or more times to select the desired frequency range for Interferential and Premodulated treatments or the pulse rate range for High Volt treatments. The GREEN LED indicates the option selected. For example, HIGH will be displayed as the default selection. Press the HIGH/LOW TOGGLE key once to select LOW, press again to select HIGH/LOW ALTERNATING, and press again to select HIGH/LOW CONSECUTIVE. For High Volt treatments, you can select High or Low only, but not both. During a treatment, the current sweeps through the range(s) selected.

    For Interferential and Premodulated, the HIGH frequency range is initially set at 80 to 150 Hz; and the LOW frequency range is 0 to 10 Hz. For High Volt, the HIGH pulse rate range is initially set at 80 to 120 Hz; and the LOW pulse rate range is 1 to 10 Hz. These frequency ranges may be modified for every treatment, if desired and new default settings for the device may also be saved. See treatment setup instructions later in this manual for a complete description of the options that may be selected.

14. TARGET/SWEEP TOGGLE: This key is pressed to select Target, Target Sweep, or Static treatment when an Interferential treatment is selected. The LED next to Target or Target Sweep will be lighted when selected. If both LEDs are OFF, the Static mode will be activated. If Target is selected, the Target pad is used to locate the exact treatment site.

15. TARGET PAD: For use during Interferential treatments when the "Target" option is selected. Touch the TARGET pad at different points on the pad to reach the precise treatment site. When you lift your finger from the Target pad, the selected point is locked until you change it again. This feature is used to place the point of interference at a specific site during an Interferential treatment.

Ultrasound Selections (Solaris 701, 708 and 709 only):

16. ULTRASOUND/COMBO D701, D708 and 709: Press this key once to begin setup of an Ultrasound treatment (the Sound LED on this key is lighted as well as the Sound LED in the channel indicator area); press this key twice to begin setup of a combination treatment (the COMBO LED is lighted as well as the Sound LED and a single Channel LED in the channel indicator area). When either of these options is chosen, the sound- head should first be plugged into the Ultrasound output jack on the side panel. For combination treatments, the special COMBO lead wire should be attached to the output jack selected for that treatment and the banana plug should be plugged in where indicated on the right side of the device behind the Ultrasound jack. In the COMBO mode, the electrotherapy treatment is delivered through the soundhead and through a single electrode which is placed on the patient. **Only single-channel electrotherapy options are available in the COMBO mode, i.e. Premod, Russian, Biphasic, and High Volt.**

ULTRASOUND/COMBO D701: The D701 is designed with a Combo Input Jack on the right side of the device to which a separate Dynatron Stim unit can be attached, allowing the stim to flow through the soundhead. After attaching the Stim unit set up the Ultrasound and Stim treatments separately.

17. ULTRASOUND FREQUENCY TOGGLE: This key is pressed one or more times to select the desired Ultrasound frequency; 1 MHz, 2 MHz, or 3 MHz.

18. ULTRASOUND DUTY CYCLE TOGGLE: This key is pressed one or more times to select the desired duty cycle for Ultrasound treatment. Options are 10, 20, or 50 percent, or Continuous.

Russian / Biphasic / High Volt Selections:

19. BIPHASIC/RUSSIAN: Press this key once to begin setup of a Biphasic treatment (the Biphasic LED is lighted); press this key twice to begin setup of a Russian treatment (the Russian LED is lighted). Biphasic and Russian treatments use a single channel (1, 2, 3 or 4) when the Normal mode is selected; and a channel pair (1-2 or 3-4) when the Reciprocal or Co-contraction mode is selected. Channels 3-4 pair treatments are only available on the Solaris 706 and the Solaris 709.

20. TREATMENT MODE TOGGLE (for Biphasic and Russian Treatment Modes): Press this key one or more times to select Normal, Co-Contraction, or Reciprocal contraction. The output channel is automatically selected. When Normal is selected, one output jack only is selected.

    When Co-contraction or Reciprocal is selected, a channel pair is selected (either channels 1-2 or channels 3-4). Connect the patient lead wire(s) to the output jack(s) for the channel(s) selected. Channels 3-4 pair treatments are only available on the Solaris 709 and the Solaris 706.

21. HIGH VOLT: Press this key to begin setup of a High Voltage Pulsed Stimulation treatment (the High Volt LED is lighted). The HV output channel is automatically selected (the LED for the channel selected is GREEN). Connect the patient lead wire to the HV output jack indicated by the green LED. Press the Channel Toggle key to select HV Probe treatment, if desired. For probe treatments, increase (+) and decrease (-) intensity indicator switches are located on the probe handle.

    HIGH VOLT POLARITY: Polarity on a High Volt treatment defaults to negative (-). To select or change the polarity of a High Volt treatment, hold down the FUNCTION KEY and press the HI VOLT key one or more times to select positive only (the "+" LED is lighted), negative polarity only (the "-" LED is lighted), or dual polarity (both (+) and (-) LEDs are lighted).

22. CONTRACTION/REST CYCLE TOGGLE (for Russian, Biphasic, and High Volt treatments): Press this key one or more times to select the desired contraction/rest (on/off) cycle. Available cycles include 10/10, 10/30, 10/50, Continuous and Custom. The CUSTOM DUTY CYCLE is a new feature that allows you to customize the treatment by selecting from an ON time from 3to 20 seconds, and an OFF time from 3 to 120 seconds. The OFF time cannot be less than the ON time. In addition, you can modify the pulse rate, the pulse duration, and the ramp time. The first value indicates the on-time in seconds, and the second value indicates the off-time. For example; 10/30 indicates the current is on (muscle is contracting) for 10 seconds, and current is off (muscle is relaxed) for 30 seconds. With Continuous mode, current is applied continuously with no off cycle. The continuous duty cycle is not recommended for

electrical muscle stimulation, but may be used for settings that are intended to effect other results than a muscle contraction.

23. RAMP TOGGLE: (for Russian, Biphasic, and High Volt treatments): This key is pressed to select the ramp time. The ramp time is applied before and after the "On" segment of the cycle (it provides both a ramp up and a ramp down). Available ramp times are .5, 1, 1.5, and 2 seconds. NOTE: The ramp up and down time is the same.

Microcurrent Selections:

24. MICRO: Press this key to begin setup of a Microcurrent treatment. This key is also used to turn the conductance tone OFF and ON after a Microcurrent treatment is started. When the MICRO key is pressed, Channel 1 is automatically selected for the default electrodes treatment and the LED for that channel is lighted. For a Microcurrent treatment setup with electrodes, connect the patient lead wire to the CHANNEL 1 output jack.

    For a Microcurrent probes treatment, press the CHANNEL TOGGLE key to select PROBE after selecting MICRO and both the PROBE and MICRO LEDs are lighted. For a Microcurrent Probe treatment connect the MultiStim probe to the STIM PROBE OUTPUT JACK on the side panel of the device.

    NOTE: Channel 1 is committed to the Microcurrent output during a probes treatment as well as during a treatment with electrodes, and is not available for use by any other modality while any Microcurrent treatment is in progress.

    MICROCURRENT POLARITY: To select or change the polarity of a microcurrent treatment, use the MICRO key together with the FUNCTION key. Press and continue holding the FUNCTION key while pressing the MICRO key one or more times to select positive only (the "+" LED is lighted), negative polarity only (the "-" LED is lighted), or dual polarity (both LEDs are lighted).

    MICROCURRENT AUDIO TONE: The audible tone is defaulted to ON for probes treatments and OFF for electrode treatments, but may be changed. After the Microcurrent treatment has started the MICRO key acts as a toggle key to turn the tone ON and OFF. Press MICRO to turn the tone ON or OFF.

    You may also adjust the tone volume after the treatment has started. To adjust the volume, PRESS and HOLD the FUNCTION key. Then while continuing to press the FUNCTION key, use the POWER/INTENSITY ARROW keys to raise or lower the volume until a comfortable volume setting is found. The POWER/INTENSITY display will temporarily show an incremental value representing the volume selection. You must continue holding the FUNCTION key down while adjusting the volume. When you release the FUNCTION key, the POWER/INTENSITY display returns to its normal display.

Direct Current Selections:

25. DIRECT CURRENT: This key selects the Direct Current modality. Since this modality is a probes-only treatment, the MULTISTIM probe must be plugged into the STIM PROBE JACK before a treatment may proceed. All control for intensity and actuation is from switches located on the probe. Intensity is displayed in mA (maximum 20 mA). Duration is displayed in mSec in the TIME DISPLAY with pulse duration selection from 0.1 mSec to 500 mSec. To change the polarity, hold down the FUNCTION KEY and press the DIRECT CURRENT button. Pressing one or more times will toggle through the options of positive, or negative.

Light Therapy Selections:

26. LIGHT THERAPY: **Caution: Always begin by plugging the Light Therapy Probe or Pad into the base console unit before turning ON the device. Please note, when using a Dynatron Xp pad, a Solaris Booster Box is required.** Press the Light Therapy key to begin setup for either a probe or pad treatment.

    PROBE: The Solaris device will recognize the type of probe that has been inserted into the Solaris console. The CLUSTER LED or LASER LED (SLD on the D701) and the PROBE LED are lighted.

    PAD: After pressing LIGHT THERAPY, press the CH toggle key to complete setup for a Pad treatment. The PROBE LED will go OFF, while the CLUSTER LED will remain lighted.

    START: Pressing START on the base Solaris console will immediately begin an Infrared Light Pad treatment; however, for a Probe treatment pressing START on the console will only activate the Probe in preparation for a treatment. The YELLOW LED on the Light Therapy Probe handle will be lighted. A Probe treatment will begin when the 1/0 (ON/OFF) key on the Probe handle is pressed and the LED on the probe handle is GREEN. A green LED next to OUTPUT on the faceplate will indicate that a LIGHT THERAPY treatment is in progress.

    CAUTION: Vents surrounding the Light Therapy probes must be kept clear and free of any obstruction at all times. Do Not cover the XP pad with towels or blankets during treatment.

Conductance

27. The Solaris devices continuously measures conductance during electrical stim treatments for Interferential, Premod, and Microcurrent to ensure that the treatment outcome is optimal and to minimize the possibility of patient discomfort due to poor conductance and/or changes in current density. As conductance is measured, Solaris displays the results in graph form on the CONDUCTANCE bar located on the front panel of the device. Optimum conductance is displayed as a GREEN bar filling the entire graph. If the green bar only partially fills the graph area, the conductance is at a percentage of optimum.

    Conductance: Conductance is how readily electrical current is passed from the electrode to the skin surface during a treatment. Conductance affects current density. A worn electrode that does not conduct the current evenly over its entire surface will have "hot spots" where a greater amount of current flows through a smaller area which means the current density is higher at that point than elsewhere on the electrode. "Hot Spots" can lead to patient discomfort. Never risk patient comfort by using worn electrodes or lead wires.

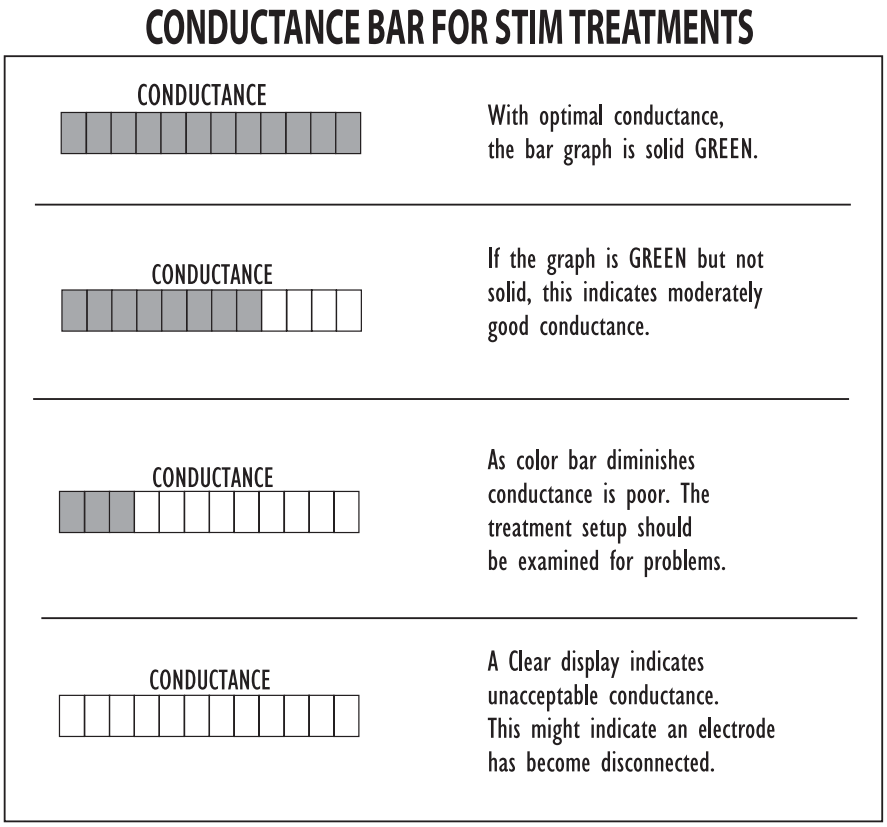
    Intensity: The intensity level is a convenient incremental measurement. However, raising the intensity increases the current delivered to the patient but does not improve conductance.

    Current Density: Current density is the amount of current that passes through a given area of the electrode. Current density varies depending on the size of the electrode, the conductance and the intensity setting, and has an effect on patient comfort. With proper setup and good accessories, current is dispersed evenly over the entire surface of the electrode. The smaller the electrode, the greater the density of the current delivered through the area. To reduce current density and improve patient comfort, you can either use larger electrodes, or a lower intensity setting, or both.

During a Microcurrent probe treatment, the graph is also useful in observing conductance changes since the goal of some microcurrent treatments is to increase conductance (reduce resistance/impedance) at a given point.

During an Ultrasound treatment, the graph is used to assist with monitoring patient coupling. This feature is described in the section of this manual entitled Ultrasound section of this manual entitled "Patient Coupling."

If the number of Green displayed segments begin to decrease on the graph during a treatment, it is important to determine the cause of the poor conductance. Remember with poor conductance you may inadvertently increase current density at a small point under the electrode and cause patient discomfort. Following are some considerations to insure proper conductance.


CONDUCTANCE BAR FOR STIM TREATMENTS
CONDUCTANCE
With optimal conductance, the bar graph is solid GREEN.
CONDUCTANCE
If the graph is GREEN but not solid, this indicates moderately good conductance.
CONDUCTANCE
As color bar diminishes conductance is poor. The treatment setup should be examined for problems.
CONDUCTANCE
A Clear display indicates unacceptable conductance. This might indicate an electrode has become disconnected.

The bar graph uses twelve lighted segments to indicate best conductance, and no lighted segments to indicate poorest conductance.

- Check to be sure electrodes are not worn or that self-adhesive electrodes have not lost their adhesiveness. These are the most common causes of poor current delivery. Both self-adhesive and carbon electrodes eventually lose their ability to conduct current effectively. See "Electrotherapy Usage Cautions" in this manual for recommended intensity settings and usage limits.
- Check to ensure the entire surface of the poly adhesive electrode is adhering.
- Self-adhesive electrodes do not require sterilization, however, electrodes should be clean and hydrated (see package instructions or "Self-Adhesive Electrodes" section of this manual).
- Check to be sure electrodes are not worn or that self-adhesive electrodes have not lost their adhesiveness. These are the most common causes of poor current delivery. Both self-adhesive and carbon electrodes eventually lose their ability to conduct current effectively.

- See "Electrotherapy Usage Cautions" in this manual for recommended intensity settings and usage limits.
- Check to ensure the entire surface of the poly adhesive electrode is adhering.
- Self-adhesive electrodes do not require sterilization, however, electrodes should be clean and hydrated (see package instructions or "Self-Adhesive Electrodes" section of this manual).
- Check to be sure the snap adapters haven't fallen off or that the lead wire has not become disconnected from the electrodes or the device.
- Make sure carbon electrodes have a secure connection with the pin ends of the leads. Over time the carbon electrodes may become too loose to use safely and the electrodes must be replaced.
- Check for corrosion on lead ends.
- Make sure carbon electrodes are adequately moistened and free from build-up to allow complete contact across the surface of the electrode.
- Observe the electrode placement. Some areas of the patient's body conduct current better than others. In areas where resistance is high you may be unable to obtain optimum conductivity.
- Check the dryness of the patient's skin. Dry skin does not conduct current well.
- Check to see if the electrodes do not adhere properly when a patient shifts position during a treatment. Worn electrodes could become loose and a significant change in conductance could result.

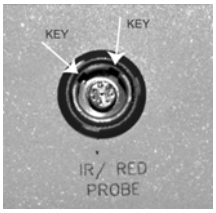
Remember to treat at the patient's comfort level. It is not important to reach a given intensity level. It is only important to set the treatment at a level that is comfortable to the patient. See "Electrotherapy Usage Cautions in this manual for suggested intensity limits.

Output Connectors and Jacks

Connectors and jacks on the Solaris device are "Keyed/Locking" connectors (see illustration to the right and on the following page). Use caution when inserting the connectors into the output jacks. When the keys are properly aligned, the connector and jack will slide together smoothly and exactly. When removing the connector, the locking mechanism is released when the outside connector shell is pulled away from the device. ***Do not force the connector or damage to the pins may occur. This damage is not covered by warranty.***

"Keved" Ultrasound Jack

Note: Devices that have been custom ordered with the Patient REMOTE STOP cable will have an additional jack located on the back of the base unit. The remote stop is controlled by the patient during unattended therapy to allow the patient to stop the treatment at any time. When the button on the remote stop cable is pressed, output for all stim modalities and pad treatments is stopped and the tone sounds briefly. During Combo treatments, both sound and stim outputs are stopped.



"Keyed" Probe Jack

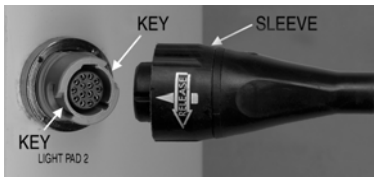
Keyed" Probe Connectors

When attaching the probe, align the raised portion of the connector with the notched jack opening. When removing the probe connector, the locking mechanism is released when the outside connector shell is gently pulled away from the base unit.

"Keyed" Probe Jack

"Keyed" Pad Connectors

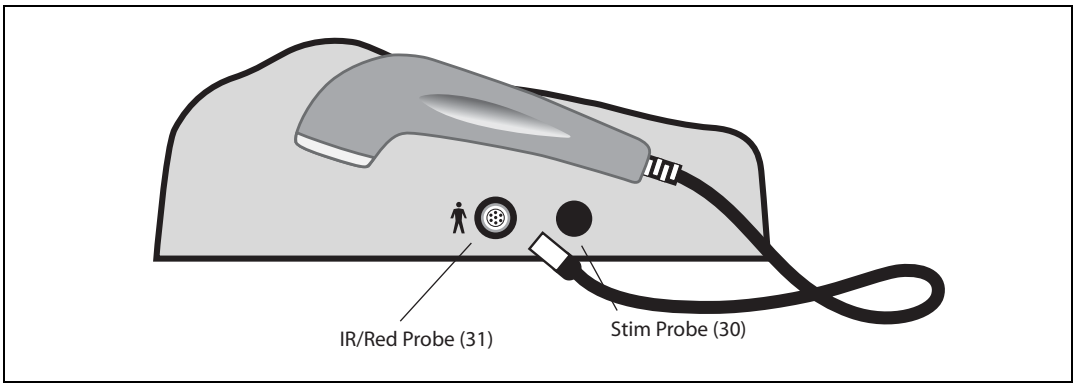
The Pad connector is attached by aligning the connector with the keyed openings in the jack and pushing the connector into the jack. To remove the connector, turn the sleeve to the left in the direction of the "Release" arrow and gently remove the connector. Do not use force when attaching or removing the connector.



"Keyed" Pad Connector

28. OUTPUT JACK CHANNELS 1, 2, 3, and 4: These are the output jacks for delivering Interferential, Premodulated, Russian, Biphasic, and Microcurrent treatments. These channels are located in the front of the device. Front (left to right as you face the device).

29. HIGH VOLT OUTPUT JACK CHANNEL HV. This is the output jack dedicated to delivering High Volt pad treatments, located in front on the far right side.



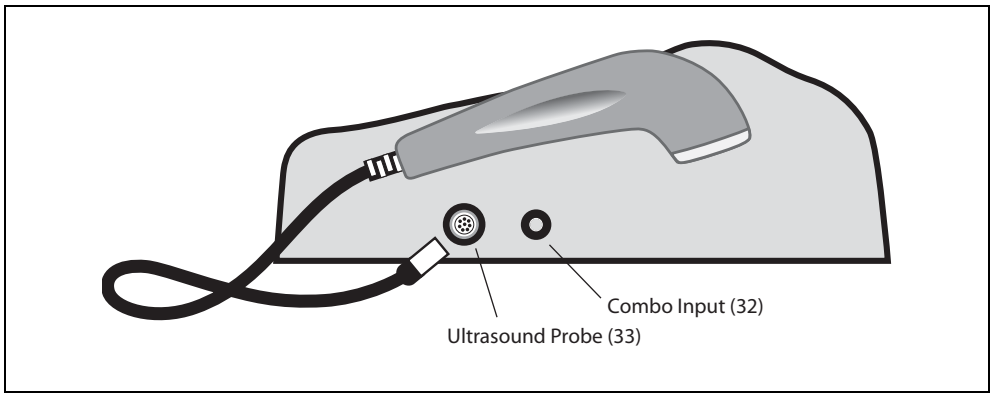
Solaris Left Side View

30. STIM PROBE JACK - MICROCURRENT/HV/DC PROBES TREATMENTS: The universal MultiStim probe plugs into this jack for Microcurrent, High Volt or DC probe therapy. After the probe is connected and either Microcurrent or High Volt keys have been pressed, press the TIME TOGGLE key to select PROBE. If the Direct Current modality is selected, the device will automatically default to PROBE. See illustration above.

31. DYNATRON LIGHT THERAPY (IR/RED) OUTPUT JACK: This output jack is designed to accommodate a single probe. When one of the Dynatron Solaris probes is connected, the device will recognize the probe and will auto calculate time/dosage (J/cm^2), Joules, and total treatment time. See illustration above.

32. COMBINATION TREATMENT JACK: The special combo lead wire for combination treatments is plugged into this jack located on the right side of the device for a combination treatment setup providing stim output through the Ultrasound head of the D708, D709. For combination treatments using the D701, the Dynatron stim device is plugged into the Combination Treatment Jack using a pin-to-banana adapter. The special lead wire on the D708 and D709 is also plugged into the jack on the front of

the device which has been selected for the specific COMBO treatment. See combination treatment instructions later in this manual for detailed information regarding combination treatment setup. See illustration on the following page.

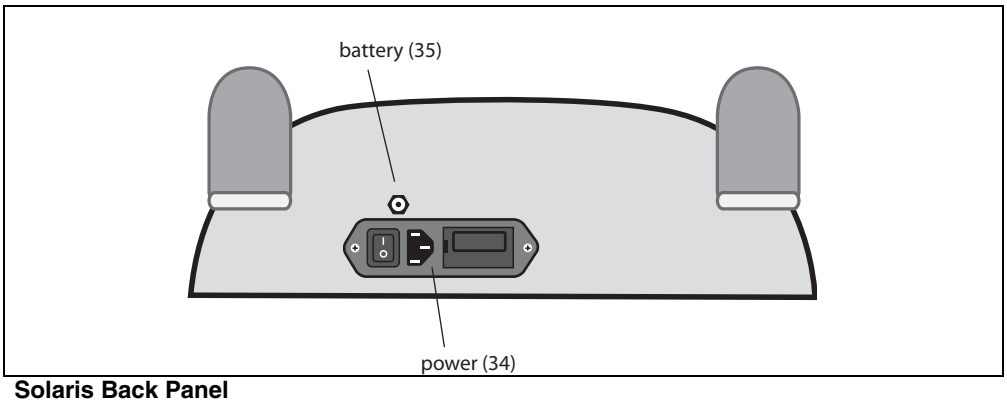


Solaris Right Side View

33. ULTRASOUND OUTPUT JACK (Ultrasound models only): The applicator soundhead plugs into this jack for Ultrasound therapy. Located on the right side of the device. See diagram on previous page.

Power Switch / Battery

34. POWER 1/0 (ON/OFF) SWITCH: Located on the back of the unit this switch is labeled "1" and "0". Set the switch to "1" for ON; set the switch to "0" for OFF.



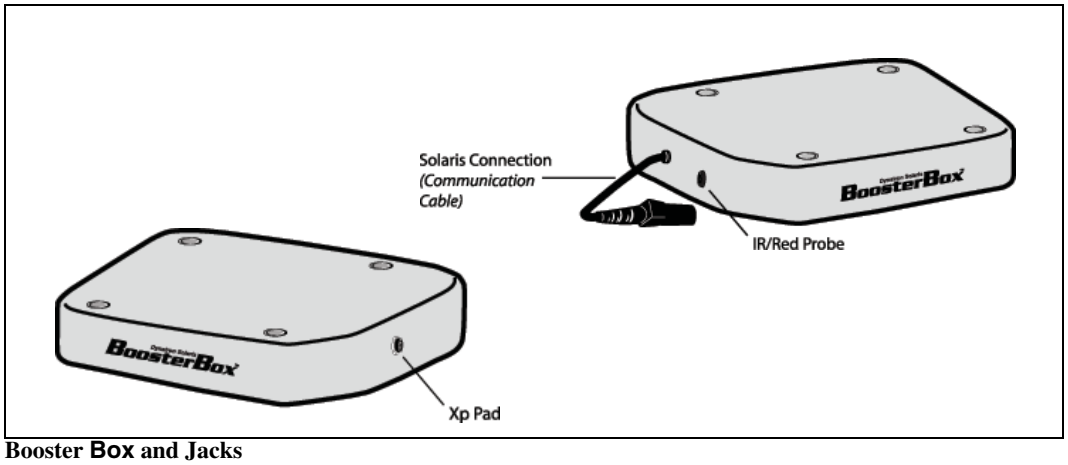
Solaris Back Panel

35. BATTERY: This jack may be used to supply power to the device using an optional battery pack. More information about the optional battery operation is provided later in this manual. (See illustration on the previous page).

Booster Box / Booster Box Jacks

36. BOOSTER BOX / BOOSTER BOX JACKS (The Dynatron Booster Box is required for use with the Dynatron Xp Pad on all Solaris 700 Series devices): The Dynatron Booster Box is engineered to provide the additional power needed to operate the Dynatron Xp Infrared Light pad. The Booster Box mirrors the outline of the outer-contours of the Solaris console and stands approximately 2" in height. The flat upper surface of the Booster Box is designed with four pre-molded circular receptacles at each corner in which to place the rubber feet of the Solaris console, thus allowing the two units to fit

together with the appearance of a single device. The two units are electrically and functionally connected by a communication cable (labeled SOLARIS CONNECTION) attached to the Booster Box and designed to be plugged into the IR/RED output jack located on the left side of the main Solaris console.



Booster Box and Jacks

The Booster Box has two output jacks: A LIGHT PROBE jack located on the left side of the device in front of the communication cable and a LIGHT PAD output jack located on the right side of the Booster Box. Please note: **Only one Light Therapy treatment (either probe or pad) may be given at a time.**

Instructions for Using Toggle Keys

Toggle keys are used to make selections from two or more options in a given area. Toggle keys are pressed one or more times to make a desired selection. A **GREEN light** (LED) next to the toggle key shows the option that has been selected. Pressing the toggle key one or more times allows you to scan through the available options.

Each toggle key has unique capabilities. Most toggle keys allow only one selection. For example, the Ramp toggle key requires you to select just one of the four ramp times available. However, some toggle keys allow you to select two options. For example, in Interferential you can press the HIGH/LOW TOGGLE key once to select High, press again to select Low, and press again to select both High and Low.

The following is a list of all the toggle keys available with each modality:

IFC and Premod
- Target/Sweep (IFC only)
- High/Low Frequency Ranges

Russian and Biphasic Stim
- Treatment mode
- Contraction/Rest cycle
- Ramp Time

High Volt Stim
- Contraction/Rest cycle
- Ramp Time
- Polarity
- High/Low Pulse Rate Ranges
- Channel toggle to select Pads/HV Channel or Probes Treatment (during setup only)

Microcurrent
- Microcurrent Polarity
- Channel toggle to select Pads/Channel 1 or Probes Treatment (during setup only)
- Turn audible Conductance Tone ON/OFF

DC
- Polarity

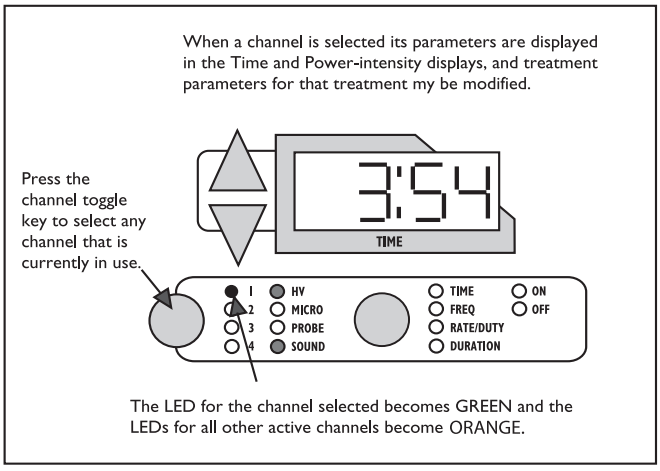
Light Therapy
- CH Channel Toggle to select Pad or Probes Treatment

Ultrasound
- Ultrasound Frequency
- Ultrasound Duty Cycle

All Modalities
- Time/Frequency/Rate/Duration, etc., (only appropriate parameters for a given modality are selectable)
- Channel Toggle (to view individual channels one at a time while treatments are in progress)

Channel Output Indicator Lights

The TIME display and the POWER INTENSITY display can show the settings for only one channel at a time. The Time and Power-Intensity settings displayed are for the channel with the GREEN light only. Any other channel in use at that time will have a YELLOW light to show it is active but its parameters are not currently displayed.



Channel Toggle Key

To view the settings for another channel or output, press the channel toggle key one or more times until the light for the desired channel becomes GREEN. The GREEN light appears next to a different channel or output each time you press the toggle key, and the TIME and POWER/INTENSITY displays change to show the parameters currently in effect for that channel. The GREEN and YELLOW channel lights will also appear solid (non-flashing) or flashing. A solid light means therapy is being delivered to the channel at this time (for example, during the ON cycle of the Russian stimulation treatment). A flashing light means current is not being delivered to channel at this time (for example, during the OFF cycle of the Russian stimulation treatment).

CHANNEL / OUTPUT INDICATOR LIGHTS

GREEN Solid	• You **CAN** see this channel's parameters displayed on Time and Power-Intensity displays. • The channel **IS** delivering current.
GREEN Flashing	• You **CAN** see this channel's parameters displayed on Time and Power-Intensity displays. • The channel **IS NOT** delivering current.

YELLOW Solid	• You **CANNOT** see this channel's parameters displayed on Time and Power-Intensity displays. • The channel **IS** delivering current.
YELLOW Flashing	• You **CANNOT** see this channel's parameters displayed on Time and Power-Intensity displays. • The channel **IS NOT** delivering current.

Current Limit

The Dynatron Solaris devices continuously measure the actual current output during a treatment and limit the output current to the level indicated in "Technical Information" in this manual. As you increase the intensity of a treatment, you also increase current output. If you reach the maximum current limit, the device issues a warning (described below). This warning is to alert you to the fact that you may have set the treatment intensity too high and to prevent the possibility of patient discomfort caused by too high current output.

Current Limit Warning

When you reach the maximum output current limit, the device will:

- Immediately stop increasing the intensity and automatically reduce the intensity a few increments
- Beep several times
- Flash the intensity display

You should rarely, if ever, encounter the current limit warning during a patient treatment as reaching the current limit would often require an intensity setting that is uncomfortable and intolerable to most patients. For patient safety and comfort, you must address this warning before continuing with the treatment. Consider the following possible causes, for example:

- The patient is unable to adequately feel the current and is unable, therefore, to report discomfort at the high intensity level.
- When using four very large electrodes for a treatment, current is dispersed over a larger electrode surface area permitting a higher intensity setting without discomfort to the patient.

As you increase the intensity, ensure that the patient feels the current as expected. If the patient is unable to feel the current, you could unintentionally raise the current to a level much too high and risk causing unnecessary, possibly severe discomfort to the patient. Keep the intensity very low if the patient has little or no feeling in the treatment area (see "Contraindications, Warnings, and Precautions" in this manual).

Keep in mind, a wide range of factors can cause the patient to lack sufficient feeling in the treatment area, including, but not limited to, pain control drugs, use of ice packs, neurological damage, etc. Always consider these and other factors when delivering an electrotherapy treatment, and determine intensity settings based upon your medical expertise and judgment.

If you encounter the Current Limit warning, it could indicate that the patient cannot adequately feel the current. Ensure that the patient can <u>feel</u> the current. If you are treating an area that may be desensitized for any reason, reduce the intensity immediately. Read all the warnings regarding treatment of desensitized areas provided in this manual under "Contraindications, Warnings, and Precautions."

Lead Wires / Electrodes

DID YOU KNOW?

- Lead wires should be replaced at least every six months.
- Carbon electrodes should be replaced approximately every six months.
- Self-adhesive electrodes should be replaced after no more than 15 uses.
- You should never use monitoring electrodes nor ordinary TENS electrodes with this device.
- Some brands of electrodes are of very poor quality or are inappropriate for electrotherapy. Your patient may experience discomfort and even skin reaction due to poor distribution of current when using these electrodes.

Failure to replace worn lead wires and carbon electrodes or using cheap, poor quality electrodes are some of the most common causes of patient discomfort.

Lead Wires

Even with good care, lead wires will eventually develop breaks (open connections) simply from normal usage, and they must be replaced. **Lead wires have a limited lifetime and must be replaced about every six months**. Lead wires can be damaged due to jerking or pulling on the wires; excessive bending or tight wrapping of the wires; or running over the wire with a device cart. When setting up treatments, keep lead wires out of areas where a person could trip on them. When storing, lead wires should be loosely wrapped to prevent any kinking in the lead wire. Never use worn or damaged leads to treat a patient. Using faulty leads may result in injury to a patient.

Test Leads Daily. Lead wires should be tested regularly to ensure they are functioning properly and safely. A simple test performed with the Dynatron Solaris devices makes daily lead testing convenient. Damaged or worn leads should be discarded and replaced. Under normal use, leads should be replaced about every 6 months. Instructions for testing are provided below.

Remove Corrosion From Lead Tips. Lead tips will build up corrosion through use. The lead tips must be cleaned and kept free of this corrosion in order to function correctly. To remove corrosion from lead tips, use steel wool to gently scrape off the corrosion. Take care not to scratch the metal plating of the tip during cleaning. If the tip's metal surface becomes pitted or uneven, the lead must be replaced.

Test Leads

To test leads, perform the following steps daily. Begin with the machine turned off.

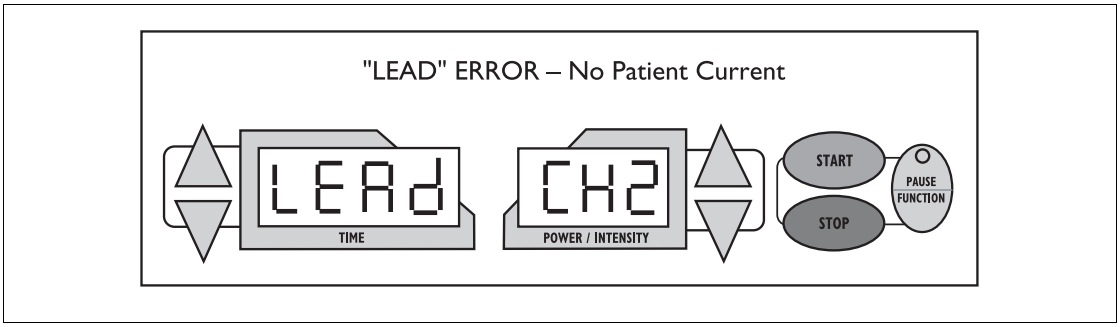
1. Press and hold the TARGET/SWEEP toggle key while turning the device on. After initial power up, the **Lead Test** function is launched. If the device is already powered on, you can enter the Lead Test function by pressing and holding the FUNCTION key while pressing the TARGET/SWEEP toggle key. When the device is in the Lead Test mode, the Time display will read "LEAD."
2. Plug a lead into Channel 1 (no other channel is used for the lead test). Remove snap adapters (if applicable) from the leads. UNDER NO CIRCUMSTANCES SHOULD THE LEADS BE CONNECTED TO A PATIENT DURING THIS TEST!
3. Press START. A tone will sound. Hold the tips (pins) together. The tone will stop if the leads are functioning properly.

4. **Hold the pins securely together, move the leads around, wiggle the cord, especially at the jack end of the cord.** If the tone sounds, even for a short time, check to be sure you are holding the pins together. If the tone continues to sound and you are certain the pins are touching, the leads are probably bad and should be replaced.
5. After the test, remove the lead from Channel 1. Plug in the next lead to be tested, and continue testing all leads in this way.
6. To exit the Lead Test function, press STOP. The device then shows the normal treatment displays, and you may proceed with treatment setup.

NOTE: The Lead Test should be used for testing patient lead wires only. This is not an accurate means of testing carbon electrodes. Contact Dynatronics Customer Service to arrange for free testing of carbon electrodes or for instructions for testing these electrodes.

"LEAD" Warning - No Patient Current

This added safety feature warns you if the device detects an "open" or incomplete circuit during setup of an Interferential treatment. An "open" or incomplete circuit can be due to a lead that is not plugged in, an electrode that has fallen off or otherwise is not making contact with the patient, or any reason that would cause an incomplete circuit. When this occurs, current is not being delivered to the patient, and the condition must be corrected before continuing with treatment setup.



No Patient Current: During an Interferential treatment setup, if an "open" is detected, the "Lead" warning is displayed along with the channel number that triggered the error.

When the device detects this condition during the treatment setup, it will beep and display "LEAD" in the Time display. It will indicate in the Intensity display the number of the channel that has triggered the error (for example, CH2) and will prevent you from increasing the intensity setting. If this error occurs, reduce the intensity for the channel indicated, correct the condition, then return the intensity to the desired treatment level. In adjusting intensity, always observe the warnings and precautions provided in the operator's manual for this device.

This error will not be detected if the intensity is set below 11. The error condition can also be detected during setup of Premodulated treatments at the High frequency settings only. The error warning will also occur while a treatment is in progress under the same conditions described above, but will only be displayed if the affected channel is currently selected for display.

Disable the Lead Warning: If you find the lead warning feature is too sensitive for your treatment setup and is detecting conditions that are not truly open, you can adjust the sensitivity. To do this, press and hold the IFC key while powering the device on **(NEVER TURN THE DEVICE ON OR OFF WHILE LEADS ARE CONNECTED TO A PATIENT)**. The word "OPEN" is displayed in the Time display, and the default setting of

24 is displayed in the Intensity display. A lower number provides reduced sensitivity. At a zero setting no error will be displayed. Use the up/down arrow keys to change the setting, then press Start to exit this mode. The setting you select will remain as the default for the device until you change it.

Carbon Electrodes

Carbon electrodes provide an economical means of delivering electrotherapy to patients but should not be used with Microcurrent. This type of electrode lasts a long time and can be used again and again. However, if they are not properly cared for, these electrodes can fail to deliver the desired treatment and can present the possibility for injury to a patient.

To ensure greatest safety and effectiveness with your treatments, follow these rules when using carbon electrodes.

1. **Carbon electrodes must be well-moistened** prior to treatment setup. Dry carbon electrodes are very poor conductors of current and should NEVER be used. They may be moistened with either water or an electrolyte spray. Water is adequate for short treatments, but will evaporate too quickly for longer treatments. If water is used for longer treatments, you may need to interrupt the treatment and remoisten the electrodes. A special sponge fabric available with some carbon electrodes may be moistened well and used as a conductive medium (do not use ordinary sponges for this purpose). Do not use Ultrasound gel as a conductive agent with carbon electrodes.

   If you use an electrolyte spray, this liquid may be diluted with equal amounts of distilled water, if desired. This reduces the amount of build-up on the electrodes yet usually provides adequate moistening of the electrodes.

   NOTE: As you increase the intensity to higher levels during setup, if your patient feels a "biting" sensation or if the patient feels nothing, this indicates you are not getting adequate conductivity—the electrode may be too dry or is not moistened evenly across its entire surface. Stop the setup and correct the problem.

2. **Carbon electrodes must be free from any build-up**. If electrodes have a build-up from body oils or a moistening agent such as an electrolyte spray, conductivity is greatly impaired. If treatment is allowed to continue, intensity could be inhibited. When using carbon electrodes with any electrotherapy device, you must make sure conductivity is not impaired due to any type of build-up on the electrodes.

3. **How to Clean Carbon Electrodes.** Carbon electrodes from Dynatronics may be cleaned using a mild soap and a small brush (such as a nail brush). To sterilize, alcohol may be used. They may also be sterilized in an Autoclave. Daily cleaning is recommended.

4. **Carbon electrodes eventually wear out**. Do not assume you can safely use carbon electrodes indefinitely. Over time these electrodes will wear; and when worn, the amount of current delivered through the electrode will decrease and will be inconsistent over the surface of the electrode. As a general rule, carbon electrodes that are used regularly should be replaced at least every six months.

   Do not take chances with patient safety!
   Discard worn carbon electrodes!

   If you think your carbon electrodes are showing wear, you can send them to Dynatronics to be tested with an ohm meter. Good carbon electrodes should test at between 40 and 200 ohms. Unfortunately, practitioners frequently send us electrodes having resistance measuring in the thousands of ohms! Overused electrodes such as this present a potential hazard to the patient.

Self-Adhesive Electrodes

Dynatronics' self-adhesive electrodes are intended for multiple but patient specific use due to the danger of cross contamination. Improper use of the electrodes can decrease the life of the electrode and could even result in harm to your patient. The following instructions will help you achieve maximum usage from your electrodes while ensuring patient safety and comfort during treatment.

1. **Make sure the electrode is adhering and making contact with the skin across the entire surface of the electrode.** Electrodes will lose their adhesive quality when exposed to air, dust, dry skin, etc.

   To Retain Adhesiveness:

   - Electrodes should be stored in a tightly sealed pouch until used.
   - The patient's skin should be thoroughly cleaned and free from oils or flakiness prior to placing the electrodes.

   To Restore Adhesiveness:

   - Before a Treatment: Before placing the electrode on the patient, moisten the patient's skin with a damp cloth using plain water, then apply the electrode to the skin.
   - After a Treatment: Spray the adhesive side of the electrode with plain water, rub it lightly with fingertips, then reapply the electrode to its plastic backing and seal it tightly in its storage pouch. Do not use an electrolyte spray to remoisten self-adhesive electrodes as this substance can destroy the adhesive. Self-adhesive electrodes do not require sterilization.

     With this method of re-hydration, after a couple of hours electrodes can regain up to 90 per cent of their original adhesive quality.

2. **NEVER use a self-adhesive electrode for more than 15 treatments (maximum).**

3. **NEVER use STRAPS, weights, or other devices to attach self-adhesive electrodes to the skin. If an electrode has lost its adhesive quality, you can use one of the methods given above to re-hydrate the adhesive, or you should discard the electrode. Using straps and weights with self-adhesive electrodes could have an unpredictable effect on the electrodes and could cause injury.**

4. **Never use monitoring electrodes such as ECG, or EMG, nor ordinary TENS electrodes**.

5. If you see the "No Patient Current" screen message, or if you observe poor conductivity indicators, check the electrodes and lead wires for proper connection.

Quick Reference of Special Key Presses

The following is a brief list of special key presses available with this device. These options are explained in detail where they apply in the treatment instructions later in this manual. NOTE: Where two keys are required (i.e., FUNCTION-STOP) you must press FUNCTION immediately followed by STOP to achieve the result.

KEY PRESS	RESULT	DESCRIPTION
FUNCTION-STOP	STOP TREATMENT	Stop one treatment. Active treatment indicated by lighted LED will be stopped.
FUNCTION-HI VOLT	CHANGE HIGH VOLT POLARITY	Change High Volt polarity. Repeat to change again.
FUNCTION-SOUND	HEAD WARMING ON/OFF	Set head warming feature to on (HD 1) or off (HD 0)
FUNCTION	DISPLAY WATTS or W/cm^2	During Ultrasound treatment, hold for 2 seconds to change Ultrasound power display from w/cm^2 to Watts or reverse.
FUNCTION-TIME TOGGLE	DISPLAY JOULES or J/cm^2	During Light Therapy Probe/Pad treatment, press Function-Time Toggle to change the Light Therapy power display from J/cm^2 to Joules or reverse.
FUNCTION-TIME TOGGLE	TURNS OFF MICROCURRENT CONDUCTANCE BAR	During a Microcurrent treatment, press the Function-Time Toggle to turn off the Conductance Bar.
FUNCTION-TARGET/SWEEP KEY	TEST LEADS	Enter the Lead Test Function. Then press START to begin lead test, and press STOP to exit the lead test function. **NEVER DO THIS WHILE ELECTRODES ARE ATTACHED TO PATIENT.**
FUNCTION-MICRO	CHANGE MICROCURRENT POLARITY	Change Microcurrent polarity. Repeat to change again.
MICRO	AUDIO TONE ON/OFF	During a Microcurrent treatment, turn audio tone on and off.
FUNCTION – DIRECT CURRENT	CHANGE DIRECT CURRENT POLARITY	Change Direct Current polarity. Repeat to change again.
FUNCTION-INTENSITY UP & DOWN ARROW KEYS	CHANGE VOLUME	Change loudness of tone (during Microcurrent treatment only)
START	SAVE NEW DEFAULT SETTINGS	Hold for 2 seconds to save defaults for current treatment.
FUNCTION-INTENSITY DOWN ARROW	DISABLE ULTRASOUND COUPLING DETECTION	In Ultrasound mode, press and hold these keys to disable the Ultrasound coupling detection feature. The Time display will show the current setting briefly: CP1=feature on, CP0=feature off. Repeat this step to revert to the prior setting.

AT POWER ON, HOLD DOWN THE FOLLOWING KEYS WHILE THE DEVICE STARTS UP:

KEY PRESS	RESULT	DESCRIPTION
TARGET/SWEEP	LEAD TEST MODE	Press and hold on power up to enter Lead Test feature.
START	RESTORE FACTORY SETTINGS	Press and hold on power up and wait for beep to restore factory default settings.

SECTION II

OPERATION AND TREATMENT INSTRUCTIONS

Electrotherapy Information and Usage Cautions

The following are general cautions are to be observed during Interferential, Premodulated, Russian, Biphasic, High Voltage, and Direct Current stimulation. For Microcurrent electrotherapy, see additional cautions in the Microcurrent Section of this manual.

WARNING

- **NEVER turn the power ON or OFF while the unit is connected to the patient.**
- **Always STOP a treatment before removing or attaching electrodes or leads. Leads and electrodes must only be applied to the patient before a treatment is started.**
- **Never use worn or damaged leads or electrodes as these may result in injury to the patient.**
- **If using a Remote Stop cable, always give the cable to the patient prior to the treatment.**
- **See the contraindications, warnings, and precautions for Interferential and Premodulated treatments in this manual before administering a treatment to a patient.**
- **Additional warning from the Canadian Health and Welfare Department, Health Protection Branch: WARNING: Thoracic applications are contraindicated. Cardiac fibrillation may occur if output current is 50 mA RMS or greater for any output circuit. (For use in Canada and Japan, this device is limited to 50mA output.)**

Electrical stimulation, by its very nature, has the ability to irritate the patient's skin. Certain precautions should be observed to assure maximum safety and comfort for patients. A patient's tendency to have adverse reactions is dependent upon several factors. These factors are:

Current Density. This is the amount of current being delivered to the patient divided by the area through which the current is being delivered (the surface area of the electrodes being used).

Electrode Condition. Worn or dried out electrodes cause the current to concentrate in small areas of the electrode instead being evenly distributed over the entire surface of the electrode. This has the effect of concentrating and increasing the current density into small areas.

Patient Susceptibility. Some patients' skin is more sensitive to electrotherapy currents. This can cause a reaction similar to a heat rash.

Electrotherapy treatment can result in a rash, burn, or blister. The tendency to do this is dependent upon the factors listed above and can be minimized by applying the following guidelines:

1. Use only moderate current. It is not always necessary to raise the treatment intensity to just short of the patient's pain threshold to achieve adequate results. Suggested maximum treatment levels for different electrode sizes are given below (for

Interferential or Premodulated therapy). These values are not intended to be inflexible, but they should be a guideline. If your treatment goes beyond these intensities, you should examine the treatment to discover why such a high intensity setting is required.

Use as large an electrode as is practical for the application. Note that the current density in a 1.25" square electrode is over FOUR TIMES the current density in a 1.75" by 3.75" electrode for the same intensity setting. Using larger electrodes allows current to be delivered over a larger area of the body keeping the current density as low as possible and minimizing the possibility for adverse reactions.

On the following page is a chart comparing the size of the self-adhesive and carbon electrodes with their suggested maximum intensity levels. NOTE: The intensity settings should be considered maximum and not target intensities. These suggested settings apply to Interferential and Premodulated treatments. For High Voltage pulsed stimulation the intensity is displayed in volts; therefore, these suggested settings do not apply. For Biphasic or Russian stimulation treatments intended to effect a muscle contraction, it may sometimes be necessary to exceed these recommended limits to achieve the desired results. However, use caution when doing so to ensure that the patient can feel and can comfortably tolerate the electrical current. Also observe all other precautions in this section concerning leads and electrodes to ensure the higher intensity setting is not necessary as a result of defective accessories. **In any case, do not exceed patient tolerance in setting the intensity.** Consult published medical literature for more information about treatment protocols using each of these electrotherapy modalities.

	Interferential / Premodulated	
	Electrode Size	**Maximum Recommended Intensity**
Carbon Electrodes	3" round	25-30
	3" x 5"	30-40
Self-adhesive Electrodes	1.75" square	10-15
	1.75" x 3.75"	25-30
	1.25" round	10-12
	2" round	10-20
	3" round	25-30

Combination Treatment Usage Cautions

When delivering combination Ultrasound and stim treatments where the stim current is delivered through the soundhead, the following are the recommended maximum stim intensities (refers to Premodulated, Biphasic or Russian stimulation only):

Head Size	**Maximum Recommended Intensity for Electrotherapy**
2cm^2 head:	4-7
5cm^2 head:	10-15
10cm^2 head:	15-20

2. Ensure that the area on the patient's skin where the electrode is to be placed is clean and free of all foreign matter. This includes powders, perfumes, and the like, as well as body oils or dirt and grime. Cleaning with an alcohol wipe should be adequate. Allow the alcohol to fully evaporate before applying the electrodes.

   Iontophoresis occurs with all electrical current therapies and can drive any of the above-surface contaminants below the epidural layer where an allergic reaction may occur.

3. Make sure the electrodes being used are in good condition. The poly adhesive electrodes should have good adhesion over the entire surface area of the electrode. The area where

the leads attach to the electrode (either through a lead or a snap) should not be damaged such that the connection to the foil backing behind the adhesive is broken. Carbon electrodes should be deep black, and should be free of cracks in the electrode surface.

Any electrode which is suspect should be discarded—it's not worth the price of an electrode to risk harming a patient.

4. Some patients tend to be much more sensitive to electrotherapy treatments. On patients with this tendency, treat with reduced intensity and/or shorter treatment times, with possibly more frequent treatments, if required. Most reactions are localized and very short-lived, so limiting the exposure should minimize any potential for adverse reactions.

Interferential / Premodulated Instructions

An Interferential treatment uses two channels and four electrodes (channel pairs 1-2 or 3-4). The device will automatically select the first available channel pair when you select IFC. A Premodulated treatment uses one channel and two electrodes. The device will automatically select the first available channel (1, 2, 3, or 4) when you select PREMOD. If desired, you may set up multiple treatments using available channels. Please note, channels 3-4 are only available on Solaris 706 and 709.

Basic Interferential / Premod Setup

1. Choose **IFC** or **PREMOD**.
   - Plug the patient lead(s) into the output jack(s) for the channel(s) selected.
   - Attach electrodes to patient at treatment site.
2. Set the treatment **TIME**.
3. (Optional) **CUSTOMIZE FREQUENCIES** now.
4. Choose **HIGH**, **LOW**, or **HIGH/LOW** alternating, or **HIGH/LOW** consecutive using the HIGH/LOW TOGGLE key.
5. Choose **TARGET, SWEEP or STATIC** (for Interferential treatments only) using the TARGET SWEEP TOGGLE key.
6. Increase **INTENSITY** (patient will feel the current) using the POWER/INTENSITY ARROW keys.
7. If **TARGET** is selected, use the target pad to focus therapeutic beat to desired site.
8. Press **START**
9. Press **STOP** if you need to stop a treatment before its time has expired (stops all currently active treatments). Use the TIME arrow keys to bring treatment time to zero or press the FUNCTION key and immediately followed by the STOP KEY to stop only the individual displayed treatment.

NOTE: Prior to increasing intensity, electrodes must be placed on the patient and the lead(s) attached to the device. **Plug the lead(s) into the channel(s) the device selects for this treatment.** Consult published sources for electrode placements, treatment settings, and treatment times. Make sure electrodes make good contact with the patient's skin over the entire surface area of the electrode. Improper electrode contact may result in patient injury.

Detailed Interferential / Premodulated Setup

1. Press the **IFC / PREMOD** key once to choose IFC (Interferential), or press this key twice to choose PREMOD (Premodulated).

   When you choose IFC, channels 1-2 or 3-4 are automatically selected. When you choose PREMOD, the first available channel is selected. Make sure the patient lead is plugged into the correct jack(s) for the channel(s) selected. The default settings for the modality are automatically selected too, and if you wish to use the default settings, you can now increase the intensity to the desired level, then press START.

If you wish to change the treatment settings, proceed through the following steps.

2. Set **TIME**.

   The default treatment time is displayed. Use the TIME arrow keys to increase or decrease the treatment time.

3. Customize the **FREQUENCY** settings (optional).

> The default High and Low frequency settings are:
>
> HIGH range is 80 to 150 Hz.
> LOW range is 0 to 10 Hz.
>
> These ranges may be changed for a single treatment if desired, or new default settings may also be saved to apply to all future treatment setups. The same default setting applies to both Interferential and Premodulated treatments.

   You may change the frequency settings for the range you plan to select for this treatment, if desired (see illustration next page). Each Interferential or Premodulated treatment may have its own frequency settings. After you press START to begin the treatment, frequency settings will remain in effect for the duration of the treatment. If you save defaults during this treatment, the new frequency settings you have entered become the defaults for this modality. However, if you do not save the new settings, the unit will return to the current default settings for the next treatment.

   To modify the frequency during setup, first, press the HIGH/LOW TOGGLE key and select either the HIGH or the LOW frequency range. Next press the TIME TOGGLE key to select FREQ (Frequency) as the parameter you wish to change. The LED next to FREQ will be lighted. The current frequency range settings will be displayed in the TIME and POWER.INTENSITY displays as shown in the diagram on the following page. With FREQ selected and either the HIGH or LOW range selected, you may use the TIME and POWER/INTENSITY UP/DOWN ARROW keys to change the upper and lower limits of the frequency range chosen. If you set both displays to the same value, the treatment will be delivered at that single frequency rather than sweep through a frequency range.

   When you are finished setting the frequencies, press the Time toggle key to return to the Time display. After 10 seconds with no key presses, the Time display automatically returns.

4. Choose **HIGH, LOW**, **HIGH/LOW alternating,** or **HIGH/LOW consecutive**.

   Press the HIGH/LOW TOGGLE key one or more times to select the high frequency range, the low frequency range, or both. The lights next to the toggle key show what you have selected. Select from the following options:

   a. High only. Toggle until only the High light is on.

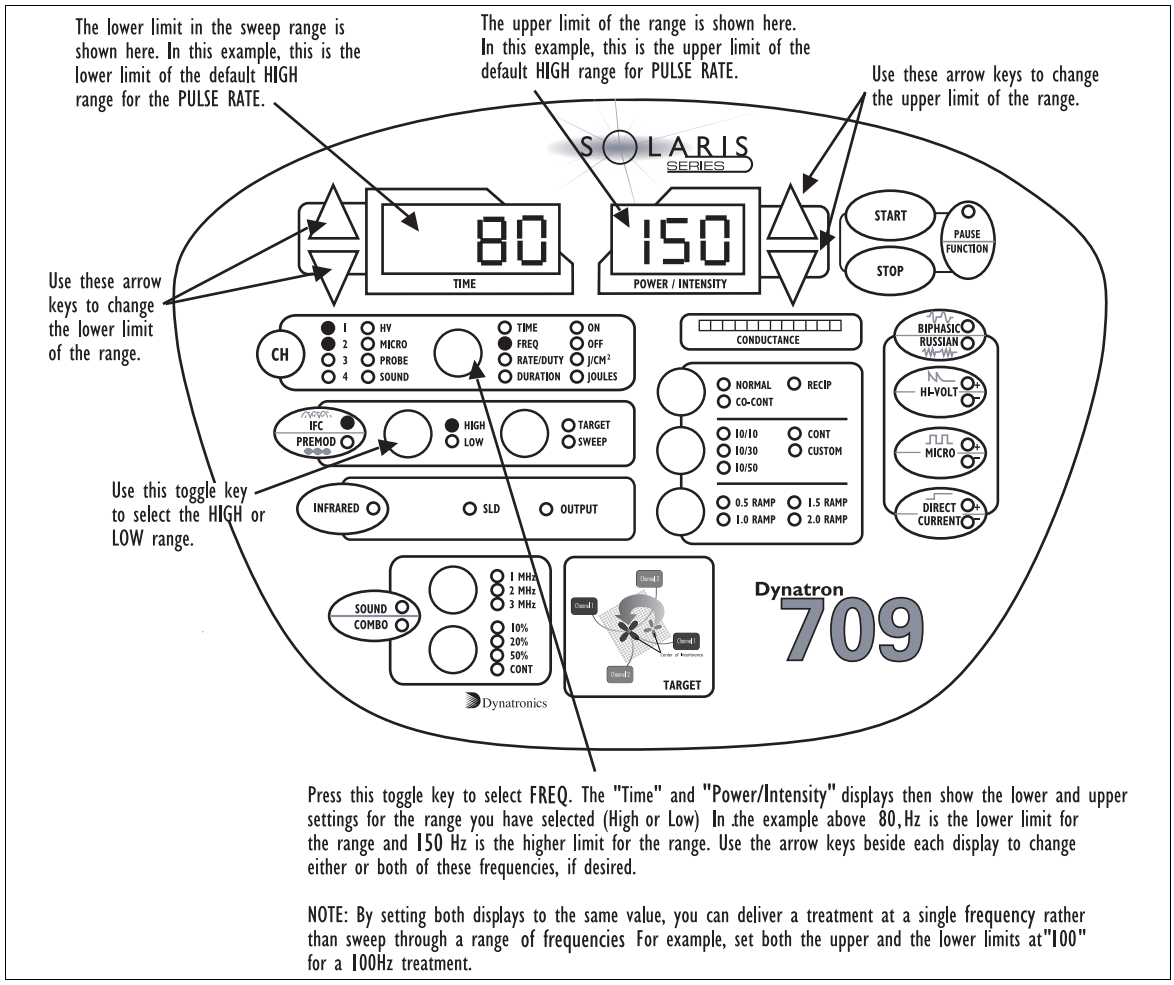
   b. Low only. Toggle until only the Low light is on.

   c. High/Low Alternating. Toggle until both High and Low lights are on, only one of these is flashing. When the treatment has started, the device alternates between the two modes at intervals of approximately 30 seconds each beginning with Low.

   d. High/Low Consecutive. Toggle again so that both High and Low are flashing. During the first half of the treatment time the High frequency range is delivered. During the second half of the treatment time the Low frequency range is delivered.

NOTE: Make any desired changes to the treatment time before selecting Consecutive. Treatment time changes made after selecting Consecutive will cause the treatment to revert to an alternating treatment (option "c". above).

Once the treatment has started, the frequency range (High or Low) being delivered at a given time is indicated by the flashing High or Low light.


The lower limit in the sweep range is shown here. In this example, this is the lower limit of the default HIGH range for the PULSE RATE.
The upper limit of the range is shown here. In this example, this is the upper limit of the default HIGH range for PULSE RATE.
Use these arrow keys to change the upper limit of the range.
Use these arrow keys to change the lower limit of the range.
Use this toggle key to select the HIGH or LOW range.
SOLARIS SERIES
80
TIME
150
POWER / INTENSITY
START
STOP
PAUSE FUNCTION
CH
1 2 3 4
HV MICRO PROBE SOUND
TIME FREQ RATE/DUTY DURATION
ON OFF J/CM² JOULES
CONDUCTANCE
IFC PREMOD
HIGH LOW
TARGET SWEEP
NORMAL RECIP
CO-CONT
I0/I0 I0/30 I0/50
CONT CUSTOM
0.5 RAMP 1.5 RAMP
1.0 RAMP 2.0 RAMP
BIPHASIC RUSSIAN
HI-VOLT
MICRO
DIRECT CURRENT
INFRARED
SLD
OUTPUT
SOUND COMBO
1 MHz 2 MHz 3 MHz
10% 20% 50% CONT
TARGET
Dynatron 709
Dynatronics
Press this toggle key to select FREQ. The "Time" and "Power/Intensity" displays then show the lower and upper settings for the range you have selected (High or Low) In the example above 80 Hz is the lower limit for the range and 150 Hz is the higher limit for the range. Use the arrow keys beside each display to change either or both of these frequencies, if desired.
NOTE: By setting both displays to the same value, you can deliver a treatment at a single frequency rather than sweep through a range of frequencies For example, set both the upper and the lower limits at "100" for a 100Hz treatment.

Modify frequency ranges in Interferential or Premodulated treatments

5. Increase **INTENSITY**.
   Set the intensity by pressing the POWER/INTENSITY UP arrow key. When you increase intensity, current to the patient begins. Intensity can be decreased by pressing the DOWN arrow key. NOTE: The CONDUCTANCE BAR GRAPH will be operable at this time.

   Before selecting the intensity setting for an individual patient, see "Electrotherapy Information and Usage Cautions" in this manual for recommended intensity settings. Also see the section of this manual entitled "Contraindications, Warnings, and Precautions" for specific precautions when treating any conditions contributing to loss of sensation, or **any time the patient cannot feel the electrical stimulation.**

6. Choose **TARGET, SWEEP, or STATIC** (for Interferential only).

   TARGET. Press the TARGET/SWEEP TOGGLE key to select this option if it is not already selected. The Target feature allows you to pinpoint the treatment site to deliver the full Interferential current where it is needed.

NOTE: You must set the intensity before using the Target Pad so the patient will be able to tell you when the treatment site is found. Also remember, an injured area will often be more sensitive to the current delivered. Therefore, an intensity setting that is comfortable to the patient at first may feel uncomfortable when the treatment site is found using the TARGET PAD. If necessary, reduce the intensity to the patient's comfort level.

SWEEP. Press the TARGET/SWEEP TOGGLE key one or more times to select this option. This option uses Dynatronics' Target feature to automatically move the point of interference in a somewhat spiral fashion covering 75 to 80 percent of the area within the electrodes. This allows you to bathe a more general area with the Interferential current while retaining the full Interferential beat.

STATIC. This option is applied when neither Target nor Sweep are selected. Press the TARGET/SWEEP TOGGLE key one or more times to unselect the Target and Sweep options (the LEDs will both be off). The treatment becomes a STATIC treatment. In other words, it simply allows the two currents to take a path of least resistance and intersect at a natural point within the electrodes.

7. Press **START**

   When you press start, the treatment timer in the TIME display window begins counting down and the treatment proceeds. If you fail to set the intensity before pressing START, the intensity display will begin flashing, and you will be unable to start the treatment until you set the intensity.

   SAVE DEFAULTS. If the treatment you have just set up is a frequently used treatment setup, you can save the treatment parameters as new defaults for your own machine. After setting up the treatment, simply press and hold the START key until you hear a beep indicating the treatment parameters have been saved. The next time you select that modality, these parameters are selected automatically.

8. **MODIFY** settings.

   While the treatment is in progress, you can modify any of the treatment parameters, if desired. Note: If you change the treatment time during a CONSECUTIVE High/Low treatment, the treatment will revert to ALTERNATING High/Low.

   - Use the HIGH/LOW TOGGLE key to select a different frequency option (High, Low, or High/Low alternating only. High/Low consecutive is only available during treatment setup).
   - Use the TARGET/SWEEP TOGGLE key to change this option (IFC only)
   - Use the TIME ARROW keys to increase or decrease the treatment time.
   - Use the POWER/INTENSITY ARROW keys to increase or decrease the intensity.
   - Relocate the treatment site by touching the TARGET PAD at any time during the treatment (only when TARGET is selected).

9. Press **STOP** if it is necessary to stop a treatment before time has expired.

   When the treatment time has elapsed, the current to the patient stops and a tone sounds notifying you of the treatment end. Treatments in progress may be stopped at any time using one of the following methods.

   STOP: Press this key to stop all treatments at all channels.

STOP ONE TREATMENT ONLY: If you have more than one treatment in progress, you can stop one treatment by either of the following methods. First, press the CHANNEL TOGGLE key to select the channel to be stopped (that channel's light is GREEN when selected).

FUNCTION-STOP. Press and hold the FUNCTION key and press STOP.

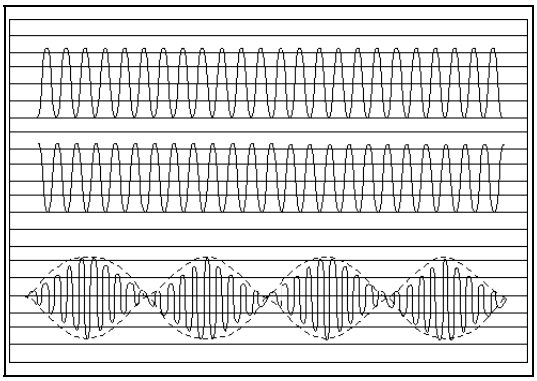
REDUCE THE TREATMENT TIME TO ZERO. Press the Time down arrow until the Time display reaches zero. The device beeps when the time reaches zero.

The output at the selected channel is stopped, and the device then displays the parameters for the next treatment that remains in progress (if there is an active treatment).

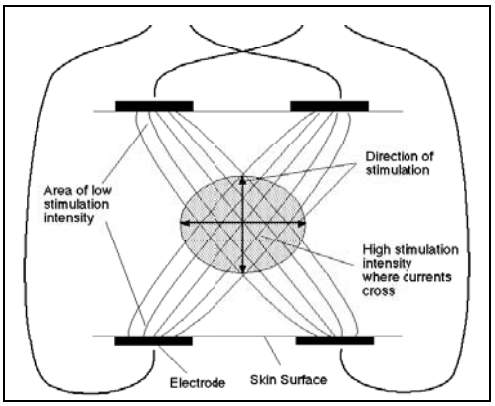
Interferential and Premodulated Modality Information

Interferential (Quadpolar) Therapy

Interferential therapy uses four electrodes to deliver two currents, one current with a constant frequency of 4000 Hz and the other current with a variable frequency of 4000 to 4150 Hz. The paths of these two currents cross resulting in a "beat" that produces the therapeutic frequency at the treatment site. The resulting frequency is between 1 and 150 Hz. An example of wave forms representing these currents is illustrated here.



The "beat" phenomenon. Two waves of different frequencies over 4000 Hz, combine to produce a beat which is between 1 and 150 Hz.



Stimulation produced by 4 electrodes.

In the Interferential mode, two output jacks (Channels 1 and 2, or 3 and 4) are utilized with four electrodes placed in a crisscross fashion, "bracketing" the treatment site as shown in the illustration to the left. The output from Channel 1 (or Channel 3) is the constant 4000 Hz wave, while the output of Channel 2 (or Channel 4) is the variable 4000 to 4150 sine wave.

Premodulated (Bipolar) Therapy

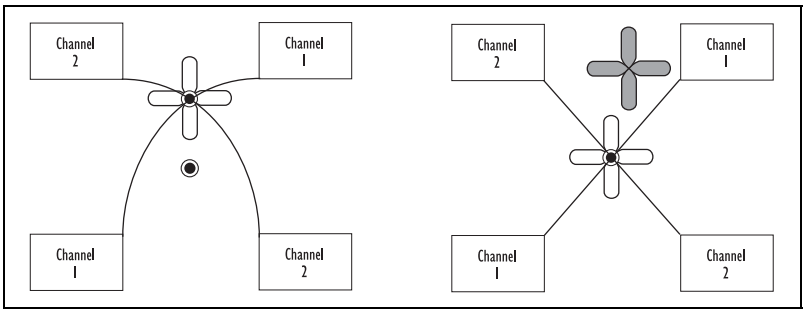
Premodulated therapy utilizes one output jack and two electrodes. The current delivered is a composite wave form. In order to produce this composite current, two frequencies are "mixed" within the device prior to output. One frequency is 4000 Hz while the second frequency covers a range between 4000 to 4150 Hz.

With the Dynatron Solaris devices, any of the four channels may be used simultaneously to deliver up to four separate, independent Premodulated treatments. A crisscross electrode setup pattern should not be used when setting up multiple Premodulated treatments. Note that a Premodulated treatment usually requires a lower intensity setting than an Interferential treatment since current is dispersed to only two electrodes rather than four (a smaller total coverage area means greater current density at the treatment site).

Target

The Dynatron Solaris Series devices feature Dynatronics' TARGET feature (available for Interferential treatments only) that simplifies electrode placement for an Interferential treatment. Interferential treatment is performed using four electrodes with two channels. The channels produce two currents which intersect producing the Interferential "beat." Without Target, it is often difficult to place the electrodes in the right position to produce the beat at the desired treatment area. This is because different types of human tissue (skin, muscle, bone, etc.) conduct current differently, making it impossible to guess the course of the two currents. Target helps eliminate the need to move the electrodes to achieve the desired result.

With Dynatronics' Target feature, you can move the center of interference (where the two currents cross) simply by moving your finger across the Target touch pad. Patient feedback will let you know when you have positioned the treatment at the desired spot.

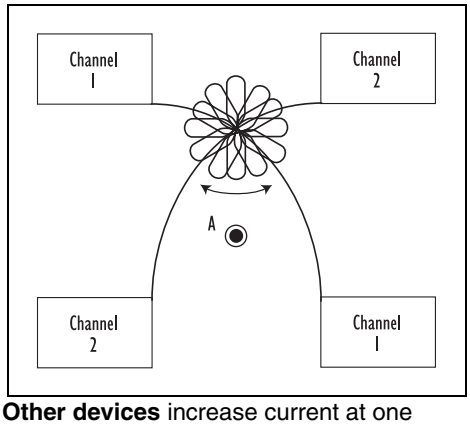


Normal Interferential currents cross at a point between electrodes. It is difficult to guess where they will cross as shown in the left diagram. With Target, you move the point of interference without moving electrodes (as shown in the diagram on the right)—just press the touch pad.

In the diagram the electrodes are placed in a position to treat a point directly in the center of the electrodes. But the center of interference actually occurs at another point. (In these illustrations the point of interference is shown in a cloverleaf shape as Interferential treatment affects a cloverleaf-shaped area.) Using the Target pad, the point of interference in easily moved to the desired treatment area.

Why Is Target Better?

The Dynatron Solaris devices employ a unique, method which actually moves the center of interference. With Target, the voltage output from both channels remains equal at all times; so wherever the treatment is applied, a full, deep Interferential beat occurs. Other devices attempt to achieve this effect by increasing the current from one channel while decreasing the current from the other channel. This method only rotates the cloverleaf-shaped area, but the center of interference does not move. In addition, the depth of the beat is reduced.



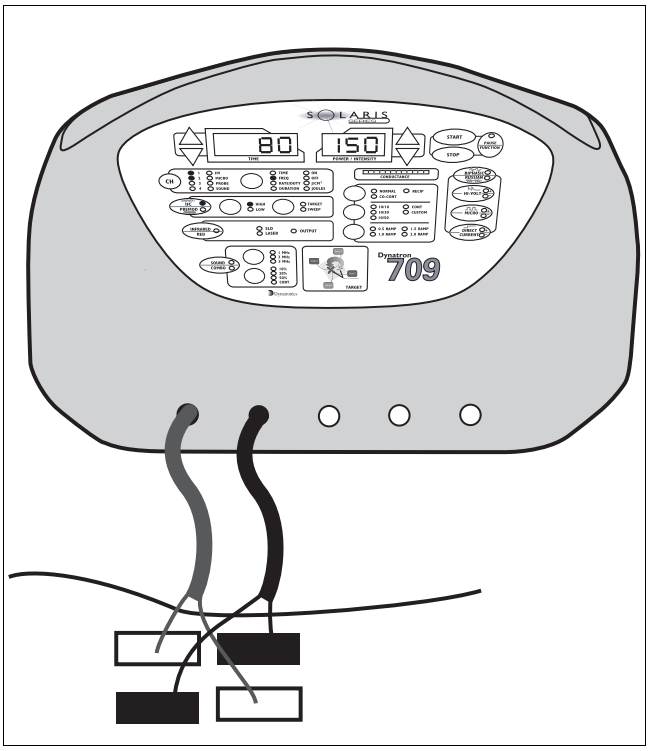
Other devices increase current at one channel while decreasing it at the other. This merely rotates the treatment. The center of interference does not move.

Target Sweep

You can use the Sweep (Target Sweep) feature to bathe a wider area with the Interferential current—up to 80 percent of the area within the electrodes may be covered. The Sweep feature utilizes the Target feature and moves the

point of interference to cover a wider treatment area while still retaining the full Interferential beat.

The Sweep option literally moves the point of interference inward and outward in a somewhat spiral pattern as shown in the illustration to the right, bathing about 80 percent of the area within the electrodes with the Interferential current.

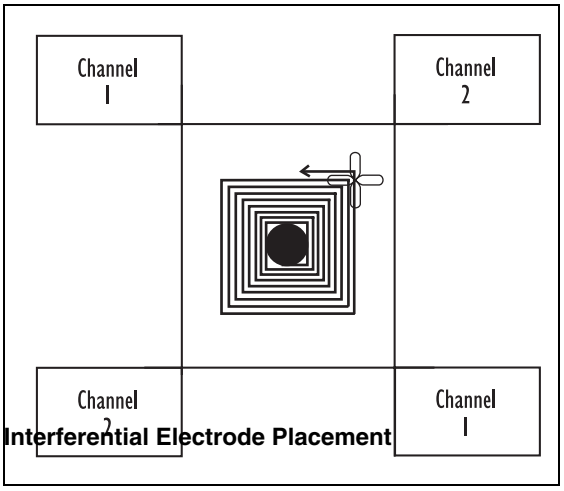


Sweep bathes a larger area with the Interferential current.

Interferential Electrode Placement

When performing Interferential therapy with a two-channel/four-electrode setup, it is important to arrange the electrodes in a crisscross manner so the current from one channel will intersect with the current from the second channel at the point where treatment is to be delivered.

Consult published literature for electrode placements for specific sites and conditions.



Interferential Electrode Placement

Interferential / Premodulated Default Settings

The following default settings are set by the manufacturer and are selected when you select IFC or PREMOD. You may change these defaults to your own preferred settings.

Interferential Default Settings

- High
- Target
- The first available channel pair (1-2 or 3-4)
- Time: 10 minutes
- Frequency Ranges (for both Interferential and Premodulated)
  - Default High Range: 80-150 Hz
  - Default Low Range: 0-10 Hz
  - Available Range: 0-150 Hz

Premodulated Default Settings

- High
- The first available channel (1 through 4)
- Time: 10 minutes
- Frequency Ranges (for both Interferential and Premodulated)
  Default High Range: 80-150 Hz
  Default Low Range: 0-10 Hz
  Available Range: 0-150 Hz

NOTE: The default frequency ranges and the High/Low option you set will be the default settings for both Interferential and Premodulated treatments. However, every treatment may be modified to have unique settings regardless of the defaults you set.

Interferential/Premodulated Therapy: 4000 Hz sine wave frequency modulated by a 4000 to 4150 Hz variable frequency sine wave of equal amplitude

Biphasic / Russian Instructions

In the Russian and Biphasic Stimulation modes the output of the device is a pulsed sinusoidal wave. Solaris allows the operator to choose a muscle contraction/relaxation cycle that is most suited for the individual patient and for the desired treatment. Once the cycle is chosen, each muscle-stimulating burst is followed by a relaxation (rest) cycle. See "Russian/Biphasic Parameters" in this manual for further discussion of pulse rate and duration, and illustrations showing the segments of the Russian Stimulation cycle and the Biphasic Stimulation cycle.

Solaris provides three modes of treatment in Russian and Biphasic Stimulation: Normal, Reciprocal and Co-Contraction. You will need to decide which mode is to be used and attach the appropriate number of leads required when setting up the treatment.

NORMAL: Use one channel with one lead wire (two electrodes). Place the electrodes so as to treat through the muscle. The contraction/relaxation cycle is selected from an option list of 10/10, 10/30, 10/50, and Continuous (there is no rest cycle with Continuous). Each time period is indicated in seconds. For example, 10/30 indicates 10 seconds of stimulation with 30 seconds of relaxation. The continuous duty cycle is not recommended for electrical muscle stimulation, but may be used for settings that are intended to effect results other than a muscle contraction.

CUSTOM: The Custom contraction/rest cycle feature allows you to customize the treatment by selecting from an ON time from 3 to 20 seconds, and an OFF time from 3 to 120 seconds. The OFF time cannot be less than the ON time. This Feature can be used with NORMAL, CO-CONTRACTION AND RECPRICAL settings.

CO-CONTRACTION: Use two channels and two lead wires (four-electrodes) for this treatment. Each pair of electrodes is placed over a different muscle group. This treatment fires the two muscle groups simultaneously—contraction and rest cycles for both treatment areas occur at the same time. Two channels are required (1-2 or 3-4). Note: 3-4 are available only on the Solaris 706 and 709.

RECIPROCAL: Use two channels and two lead wires (four electrodes) for this treatment. The reciprocal muscle stimulation fires two muscle groups (such as reciprocal flexors/extensors) one after the other. For example, with a duty cycle of 10/30, the device would deliver stimulation for 10 seconds to the first muscle, followed by 10 seconds of stimulation to the reciprocal muscle. The 30-second rest time follows each stimulation. The timing of the two cycles will overlap (the first muscle group is stimulated after a 30-second rest, even though the second muscle group is 20 seconds into its rest cycle). The Continuous contraction cycle is not available for Reciprocal treatments. Two channels are required (1-2 or 3-4). Note: 3-4 are available only on the Solaris 706 and 709.

Basic Biphasic / Russian Setup

1. Choose **BIPHASIC** or **RUSSIAN**.
2. Choose the **TREATMENT MODE** (Normal, Co-contraction, or Reciprocal using the TREATMENT MODE TOGGLE). Plug the patient lead(s) into the output jack(s) for the channel(s) selected.
3. Choose the **CONTRACTION/REST** times by pressing the CONTRACTION/REST CYCLE TOGGLE.

4. Choose the **RAMP** setting by using the RAMP TOGGLE.
5. Change the treatment **TIME**, by pressing the UP/DOWN TIME ARROW keys, if desired.
6. Change the **PULSE DURATION.** Use the TIME TOGGLE key to select DURATION. Press the TIME ARROW keys to change the pulse duration, if desired..
7. Change the **PULSE RATE**. Use the TIME TOGGLE key to select RATE/DUTY. Press the TIME ARROW keys to change the rate/duty, if desired.
8. Raise the **INTENSITY** to the desired level by pressing the POWER/INTENSITY ARROW keys.
9. For co-contraction or reciprocal treatments, toggle to the **SECOND CHANNEL** and set the **INTENSITY** for this channel.
10. Press **START**
11. Press **STOP** if you need to stop a treatment before its time has expired (stops all current treatments). Use the TIME arrow keys to bring treatment time to zero or press the FUNCTION and STOP KEY together to stop only the individual displayed treatment.

Detailed Biphasic / Russian Setup

If you do not understand the terms contraction, rest, ramp time, pulse duration, or pulse rate, consult the diagrams in the section of this manual entitled “Biphasic / Russian Parameters” in this manual.

1. Press the **BIPHASIC / RUSSIAN** key once to choose BIPHASIC, or press this key twice to choose RUSSIAN.

   When you select this modality, the default settings are automatically selected. If you wish to use the default settings, you can now increase intensity to the desired level, then press START. If you wish to change the treatment settings, do the following:

2. Choose the **TREATMENT MODE** (Normal, Co-contraction, Reciprocal).
   Press the TREATMENT MODE TOGGLE key one or more times to select Normal, Co-contraction or Reciprocal contractions (these options are explained at the start of this section). Connect the patient lead wire(s) to the channel(s) selected.

3. Choose the **CONTRACTION/REST** cycle times.

   Press the CONTRACTION/REST TOGGLE key one or more times to select contraction/rest cycle times. Available options include 10/10, 10/30, 10/50 and Continuous. The setting of 10/30, for example, means a 10-second contraction time followed by a 30-second rest time. Note that you may not select Continuous cycle for a Reciprocal treatment. The Continuous duty cycle is not recommended for electrical muscle stimulation, but may be used for settings that are intended to effect results other than a muscle contraction.

4. Choose the **RAMP** setting (does not affect Continuous treatments).

   Press the RAMP TOGGLE key one or more times to select the desired ramp time. Available options include .5, 1.0, 1.5, and 2.0 seconds. The ramp time is applied to both the start and to the end of the contraction time, and the ramp time is in addition to the contraction time itself.

5. Change the treatment **TIME**, if desired.

   The default time is displayed. Use the TIME ARROW keys to increase or decrease the treatment time.

6. Change the **PULSE DURATION** and/or **PULSE RATE**, if desired.

   The pulse DURATION (width) and RATE may be modified for each channel pair (1-2 and 3-4). **If you modify the pulse duration/rate for a Normal one-channel treatment, the second channel in the pair will also retain those same settings for the duration of the treatment. Keep this in mind if you plan to set up two Normal treatments since they will share whatever settings you choose for the first channel. Also note that the pulse duration and pulse rate may only be changed when setting up the first channel in a two-channel treatment**.

   Press the TIME TOGGLE key to select either pulse duration (width) or pulse rate. The indicator lights next to the TIME TOGGLE key show you which option is currently selected. When either pulse duration or pulse rate is selected, the current setting for that option is displayed in the TIME display (only). You can change the setting by using the TIME UP/DOWN ARROW keys. You can press the TIME TOGGLE key again to return to the TIME display, if desired. However, if you make no key presses for 10 seconds, the display automatically returns to the TIME display.

   The ranges and default settings for pulse duration (width) and pulse rate are listed later in this section.

7. Raise the **INTENSITY** to the desired level.
   Set the intensity by pressing the POWER/INTENSITY ARROW keys. When you increase intensity, current to the patient begins. Intensity can be decreased by pressing the down arrow key.

   Before selecting the intensity setting for an individual patient, see section entitled "Electrotherapy Usage Cautions" for recommended intensity settings. Also see the section of this manual entitled "Contraindications, Warnings, and Precautions" for specific precautions when treating any conditions contributing to loss of sensation, or **any time the patient cannot feel the electrical stimulation.**

   The intensity, pulse rate, and pulse duration must all be considered together when setting up the treatment as all three factors affect patient comfort. It may be necessary to adjust one or more of these parameters somewhat after the initial settings are selected to find the best settings for a given treatment and patient.

8. For co-contraction or reciprocal treatments, select the **SECOND CHANNEL** and set the **INTENSITY** for this channel.

   Intensity is set for each channel separately. Press the CHANNEL TOGGLE key to select the second channel. When you are setting intensity, only the channel with the solid GREEN light is affected. If you wish to select a channel which has an YELLOW colored light, press the Channel Toggle key until that channels' LED is selected (GREEN).

   You may only modify the parameters for the channel that is currently selected (indicated by the GREEN LED). A GREEN flashing LED indicates that the selected channel is in the rest segment of its cycle. If the light is GREEN and flashing when you begin to modify intensity, pulse rate or pulse duration, current is ramped up to treatment level for that channel so those parameters may be modified.

9. Press **START**

   When you press START the treatment timer begins counting down. If you fail to set the intensity before pressing START, the intensity display will begin flashing, and you will be unable to start the treatment until you set the intensity. For Reciprocal and Co-contraction treatments, you must set the intensity for each channel separately.

   SAVE DEFAULTS. If the treatment you have just set up is the most common Biphasic or Russian treatment setup you use, you can save the treatment parameters as new defaults for your own machine. After setting up the treatment, simply press and hold the START key for two seconds. At the end of two seconds, you will hear a beep indicating the treatment parameters have been saved. The next time you select this modality, these parameters are selected automatically.

10. **MODIFY** settings.

    While the treatment is in progress, you can modify the treatment parameters. You will need to observe the channel indicator lights when modifying a treatment.

    - When a channel's light is GREEN, the current treatment parameters for that channel are displayed. Any changes you make to the parameters will affect the channel with the GREEN light only.
    - When a channel's light is YELLOW, the channel is still active, but its parameters are not being displayed and it may not be modified until it is selected. You must first press the toggle key to select the channel—its light will then become GREEN and modifications are allowed.
    - When a light is solid (any color), this indicates the channel is in the CONTRACTION segment of the cycle and current is being delivered to that channel. When a light is flashing, this indicates the channel is in the REST segment of the cycle and current is not being delivered at this time. If you select a channel for modification while its light is flashing, the device will ramp the current up on that channel before allowing you to make modifications. When the light changes from flashing GREEN to solid GREEN, you will be able to modify the settings for the channel.

    During a Biphasic or Russian treatment you may make the following modifications:

    - Use the CONTRACTION/REST TOGGLE key to select a different contraction/rest cycle.
    - Use the RAMP TIME TOGGLE key to select a different ramp time.
    - Use the TIME ARROW keys to increase or decrease the treatment time.
    - Use the INTENSITY/DURATION ARROW keys to increase or decrease the intensity (separately for each channel).
    - Use the TIME TOGGLE key to select the Pulse Rate or Duration, then use the Time up/down arrow keys to change the pulse rate (not available for Reciprocal treatments nor when two "Normal" treatments are running simultaneously on a channel pair—CH1-2, or 3-4).

11. Press **STOP** if it is necessary to end the treatment before the treatment time has expired.

    When the treatment time has elapsed, current to the patient is stopped and a tone sounds notifying you of the treatment end. Treatments in progress may be stopped at any time using one of the following methods.

    STOP: Press this key to stop treatment at all channels.

STOP ONE TREATMENT ONLY: If you have more than one treatment in progress, you can stop one treatment by either of the following methods. First, press the CHANNEL TOGGLE key to select the channel to be stopped (that channel's light is GREEN when selected).

FUNCTION-STOP. Press and hold the FUNCTION key and press STOP.

REDUCE THE TREATMENT TIME TO ZERO. Press the TIME DOWN ARROW until the TIME display reaches zero. The device beeps when the time reaches zero.

Biphasic / Russian Modality Information

Russian Stimulation

With Russian Stimulation mode of the Dynatron Solaris devices, the output of the device is a 2500 Hz sinusoidal wave. Russian stimulation currents produce strong muscle contractions.

The Dynatron Solaris devices allow you complete control over all the parameters of the Russian Stimulation treatment. Three treatment modes include Normal for firing one muscle, Reciprocal for firing two different muscles at different times, and Co-contraction for firing two different muscles simultaneously. The Dynatron Solaris allows you to choose a muscle contraction/relaxation cycle from options of 10/10 (ten seconds on and ten seconds off), 10/30, 10/50, or continuous cycle. A new feature is the Custom cycle which allows you to select from an ON time of 3 to 20 seconds, and an OFF time of 3 to 120 seconds. The OFF time cannot be less than the ON time. In addition, you can modify the pulse rate, the pulse duration, and the ramp time. NOTE: The continuous duty cycle is not recommended for electrical muscle stimulation, but may be used for settings that are intended to effect other results than a muscle contraction.

The Normal mode requires use of just one output jack (Channel 1, 2, 3, or 4). The Reciprocal and Co-Contraction modes utilize a channel pair (Channels 1-2 or 3-4).

Biphasic Stimulation

The Biphasic stimulation feature is similar to Russian stimulation in the parameters that are selected and in the available options. It differs from Russian stimulation in the pulse duration and rate ranges. Additionally, the Biphasic pulse includes just one cycle (including one positive phase and one negative phase) per pulse.

Biphasic / Russian Parameters

The Dynatron Solaris offer even greater control over the Russian and Biphasic stimulation treatments through customization of the pulse rate and the pulse duration. The default settings and the available ranges for each of these are as follows:

Biphasic Stimulation:

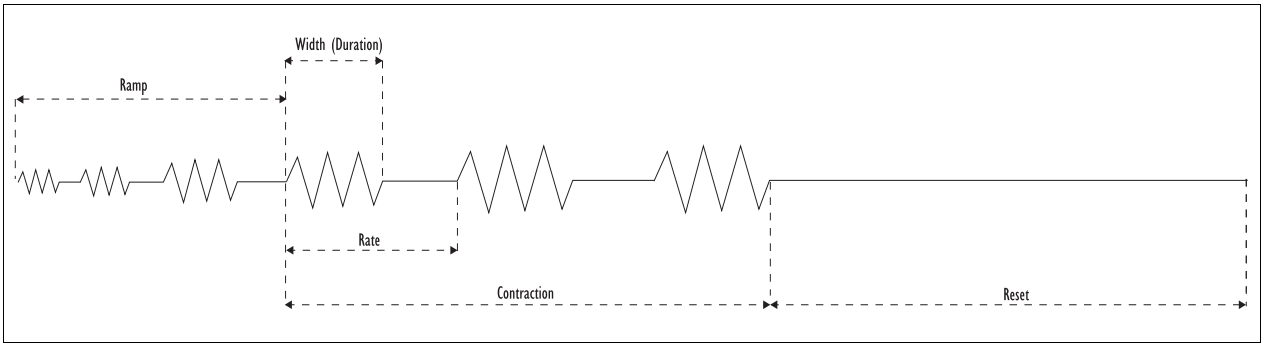
	Default Setting	**Valid Range**
Pulse Rate	50 Pulses per second	1 to 500
Pulse Duration	200 µSec	50 to 400 µSec

Russian Stimulation:

	Default Setting	**Valid Range**
Pulse Rate	50 Pulses per second	1 to 500
Pulse Duration	10 mSec	0.4 to 50 mSec (depends on Pulse Rate)

The pulse rate and duration should not be confused with the contraction/rest times in the treatment as these are different parameters; the pulse occurs only during the contraction time. The diagrams below illustrate the relationship of each of these parameters.
The **pulse duration** indicates the duration (in milliseconds or microseconds) of the output cycle of the pulse, and the **pulse rate** is measured in number of pulse occurrences per second. Between pulses, current is at zero.

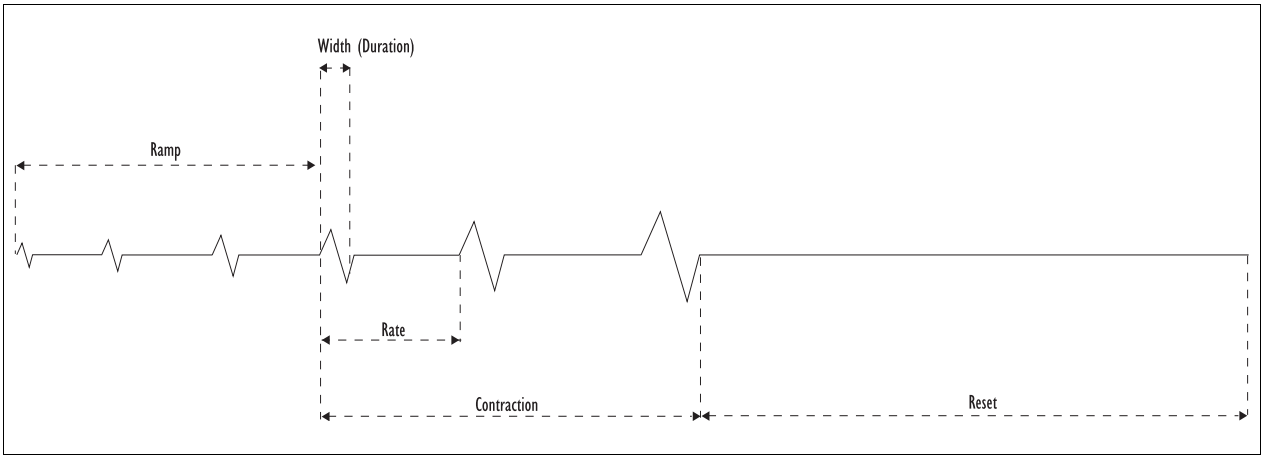
A 50 percent duty cycle or less is the usual duty cycle for Russian stimulation (the duty cycle includes one output cycle period and one zero-current period). A 50 percent duty cycle means that the length of the pulse duration must be equal to or less than the zero-current period. The number of pulses per second affects the allowable range of pulse durations. A greater number of pulses per second means a shorter pulse duration is allowed. The Dynatron Solaris will not allow you to circumvent this rule.



Russian Stimulation

If a given Russian stimulation treatment has a 50 percent duty cycle, this means the output cycle is continuously repeating for half of the pulse duration (see “Rate” in the diagram above) followed by a zero-current period for the other half of the pulse duration.

Biphasic stimulation differs from Russian stimulation in the pulse duration (width) and rate ranges, as explained above. In addition, the Biphasic pulse includes just ONE output cycle per pulse. As shown in the diagram below, one pulse cycle (including one positive phase and one negative phase) occurs, followed by a zero-current period.



Biphasic Stimulation.

The pulse rate and duration (width) may be modified during setup of a Russian or Biphasic Stimulation treatment or may be modified while a treatment is in progress.

Since a channel pair shares pulse parameters during a Russian or Biphasic treatment, you cannot mix single-channel Russian and Biphasic treatments on the same channel pair. For example, with a Normal Russian in progress on Channel 1, if you attempt to set up a Normal Biphasic treatment, the device will select Channel 3 or 4, but not Channel 2.

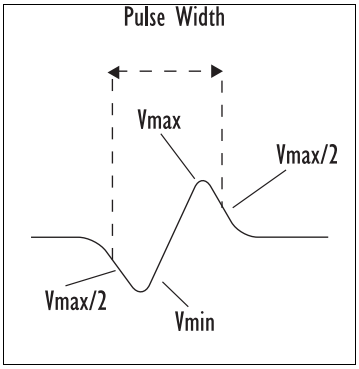
NOTE: If two Biphasic or Russian stimulation treatments are in progress on one channel pair, you may not customize the pulse rate and duration for that channel pair. When you customize the pulse rate and duration (width), it affects all simultaneous Biphasic or Russian stimulation treatments on the channel pair (1-2 or 3-4). With reciprocal treatments, modification must be made during setup of the first channel.

If you are modifying the pulse rate and duration (width) for a treatment in progress, you should also modify the intensity, as all three of these parameters will affect delivered energy and patient comfort

Biphasic / Russian Default Settings

The following default settings are set by the manufacturer and are selected when you choose Biphasic or Russian. You may change these defaults to your own preferred settings. See "Setting Defaults" in this manual.

- Normal mode
- 10/30 contraction/rest times
- Treatment time: 10 minutes
- Ramp up and down time: .5 sec.



Biphasic Stimulation pulse duration (width).

Biphasic Stimulation:

Default Setting	**Valid Range**	
Pulse Rate	50 Pulses per second	1 to 500
Pulse Duration	200 µSec	50 to 400 µSec

Biphasic Stimulation: 50 to 400 µs pulse duration @ 1-200 Hz (50% levels, see diagram)

Russian Stimulation:

	Default Setting	**Valid Range**
Pulse Rate	50 Pulses per second	1 to 500 (depends on Pulse Duration)
Pulse Duration	10 mSec	0.4 to 50 mSec

Russian Stimulation: 2500 Hz sine wave amplitude modulated at 50 Hz

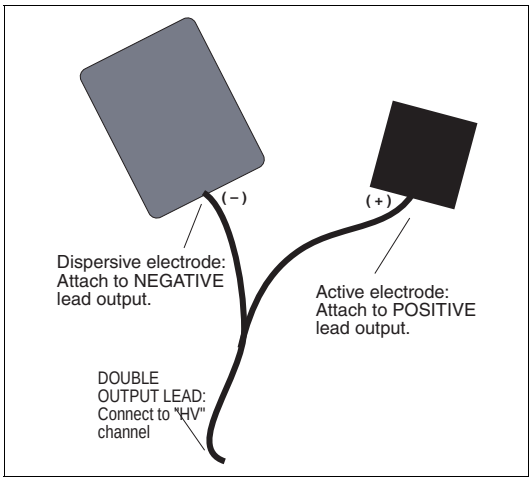
High Volt Instructions

High Volt electrical stimulation is a pulsed DC current with pulse durations in the microsecond range and pulse rates ranging from 1 to 200 Hz, with peak amplitude of up to 1.0 amp. The Solaris Series devices deliver High Volt utilizing a twin-peak monophasic waveform.

High Volt treatments with the Dynatron Solaris Series devices may be delivered using electrodes or the newly designed MultiStim probe. The device provides a dedicated channel for High Volt electrodes treatment (HV) and a separate dedicated STIM PROBE JACK for probes treatments. The Solaris device's other output channels (1-2-3-4) remain available for other stim simultaneously treatments.

Set Up High Volt Treatment with Electrodes

This treatment setup utilizes a standard lead wire with two electrodes; an active and a dispersive electrode. The size of the dispersive electrode is recommended to be double the area of the active electrode. If desired, the active output of the lead wire may be bifurcated by using an optional bifurcated extension (Part no. 7B0077) to attach additional active electrodes. However, the combined total area of the active electrodes should be no more than half the area of the single passive electrode, as illustrated.

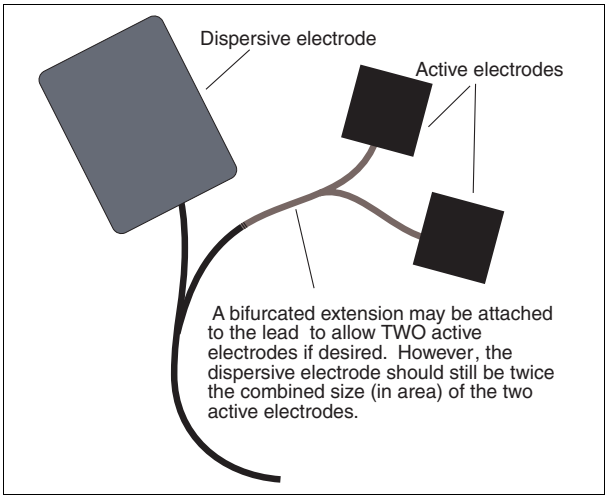


High Volt Electrode Setup

Press the HI VOLT key to automatically select the High Volt channel (HV). Connect one lead with two output connections to the HV channel.

It is best to use a lead that is marked to show polarity. The active electrode is connected to the positive output. The dispersive electrode is connected to the output end that is marked "HV Dispersive" (-). Carefully attach electrodes to ensure the polarity selected on the front panel of the device is delivered.

If desired, a bifurcated lead extension may be attached to the positive (HV Active) end of the lead wire, allowing two active electrodes to be used. In this case, be sure the dispersive electrode is at least twice the size (in area) of the combined sizes of the active electrodes. The bifurcated lead wire extension is an optional accessory available through your Dynatronics dealer.

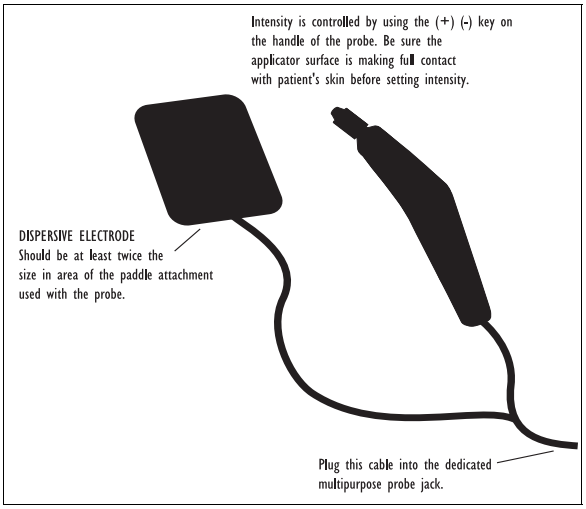

Dispersive electrode
Active electrodes
A bifurcated extension may be attached to the lead to allow TWO active electrodes if desired. However, the dispersive electrode should still be twice the combined size (in area) of the two active electrodes.

High Volt electrodes with bifurcated active lead.

During the treatment current flows in one direction between the active and dispersive electrodes. Changing the polarity in the treatment parameters has the effect of

reversing the direction of the current flow between electrodes. It is important to attach the active electrode to the HV Active (+) output of the lead wire to ensure you are delivering the selected polarity. The Lead wires are labeled: HV Active (+), HV Dispersive (-) delivery.

Set Up High Volt Probe Treatment


Intensity is controlled by using the (+) (-) key on the handle of the probe. Be sure the applicator surface is making full contact with patient's skin before setting intensity.
DISPERSIVE ELECTRODE
Should be at least twice the size in area of the paddle attachment used with the probe.
Plug this cable into the dedicated multipurpose probe jack.

High Volt Probe Setup

This attended form of High Volt therapy is delivered using the newly designed MultiStim probe in conjunction with a dispersive electrode. This hand-held probe is connected to the STIM PROBE OUTPUT JACK located on the left side of the Solaris device.

The MultiStim probe intensity is controlled on the probe itself. When using the CONTRACTION/REST cycle instead of Continuous, the HIGH VOLT channel display LED begins blinking when the treatment is in the OFF or "rest" portion of the cycle. This indicates that the probe may be repositioned over the next treatment site. By repositioning the probe only during the "rest" or OFF portion of the cycle, you ensure that the ramp is applied when the current again comes ON. The ramp provides greater patient comfort as the current resumes.

CAUTION: When setting intensity, the probe must be in contact with the patient's skin. Be sure that the patient can feel the current as you increase the intensity. Do not increase intensity for probe treatments if the patient is unable to report feeling the current.

Basic High Volt Setup

1. Press **HI VOLT**.

   Electrode Treatment
   - Plug in lead wire to the HIGH VOLT OUTPUT JACK (HV).
   - Attach electrodes to patient at this time.

   Probe Treatment
   - Press CHANNEL TOGGLE key until the PROBE LED is lighted.
   - Plug the MultiStim probe into the STIM OUTPUT JACK.
   - Attach dispersive electrode.

2. Choose the **POLARITY.** (Press FUNCTION key and HI VOLT key simultaneously). Note: Dual Polarity is not available for probe treatments.
3. For electrode treatments only, change the **TIME** by using the TIME ARROW keys. Probe Treatments count up.
4. Choose the **CONTRACTION/REST** times by using the CONTRACTION/REST TOGGLE key.
5. Choose the **RAMP** setting by pressing the RAMP TOGGLE key.
6. Select (or set up) a **PULSE RATE RANGE** (High/Low) or set a single pulse rate by using the HIGH/LOW TOGGLE key.

7. Raise the **INTENSITY** to the desired level. For a probe treatment, make sure probe is in contact with patient's skin when raising intensity.
8. Press **START.** Treatment time will begin to count-down for Electrodes treatment. For a probe treatment, press ON/OFF on the probe handle after pressing the device START key to activate the treatment. Time will begin counting up.
9. Press **STOP** if you need to stop a treatment before the desired time is reached (stops all current treatments). Press the FUNCTION and STOP KEY together to stop only the individual displayed treatment. Stop a probe treatment by pressing the ON/OFF key located on the handle of the MultiStim probe. The treatment time will return to zero.

High Volt Treatment Time

- All **PROBE TREATMENTS** are manual, and a treatment time is not set. During the probe treatment, the timer will start at zero and count UP in SECONDS when current is ON, and will return to zero when current is stopped. To begin a probe treatment, press START on the device face plate, next press the ON/OFF button on the probe. Pressing the ON/OFF button on the probe will also stop the treatment and return the time to zero. If you press STOP on the device, all therapies currently running will be terminated. If you press Function-Stop, only the High Volt treatment or treatment in focus will stop.
- **ELECTRODE TREATMENTS** are timed, and a treatment time in MINUTES is entered at the start of the treatment. The timer counts DOWN for electrode treatments.

Detailed High Volt Setup

1. Press the **HI VOLT** key.

   When you press HI VOLT, the High Volt channel and the default settings for High Voltage electrode pulsed stimulation are automatically selected. If you have not already done so, using the dedicated High Volt (HV) channel attach leads and place electrodes on the patient now. If you choose to select a High Volt Probe treatment, press the CHANNEL TOGGLE key until the PROBE LED is lighted. See instructions at the beginning of this section for setting up electrodes or probes treatments. If you wish to use the default settings, you can now increase intensity to the desired level, then press START. NOTE: For a probe treatment use the intensity arrows located on the handle of the probe. Press START on the device faceplate first, next press START on the probe handle to activate treatment. If you wish to use other settings, follow steps 2 through 8.

2. Choose the **POLARITY**

   Polarity is selected by holding down the FUNCTION key and pressing the HI VOLT key at the same time. Continue pressing FUNCTION-HI VOLT to select either positive ("+") or negative ("-") polarity or dual polarity (both "+" and "-" LEDs are lighted). NOTE: The dual polarity option is not available for probe treatments. When both negative and positive are selected, the device alternates between the two, delivering each polarity for approximately 30 seconds. Some discomfort may be felt by the patient when the polarities change. If the patient finds this setup too uncomfortable, you may consider selecting a monopolar treatment and/or reducing the intensity.

3. Choose the **CONTRACTION/REST** cycle times.

   Press the **CONTRACTION/REST TOGGLE** key one or more times to select contraction/rest cycle times. Available options include 10/10, 10/30, 10/50 and

Continuous. The setting of 10/30, for example, means a 10-second contraction time followed by a 30-second rest time.

CUSTOM CYCLE
The CUSTOM CYCLE is a new feature on the Solaris devices. When the CUSTOM LED is lighted, the default custom settings are automatically selected. To view or change the custom settings, after selecting CUSTOM, press the TIME TOGGLE key to select the ON LED. The value displayed in the TIME display is the ON time in seconds (for example: 07). Press the TIME TOGGLE key again to select the OFF LED to see the custom OFF time in seconds (for example: 12). Available ranges for ON time are 3 to 20 seconds, and for the OFF time are 3 to 120 seconds. The OFF time cannot be less than the ON time. Pressing and holding the START key until the beep is heard will save the current ON/OFF settings as the default

4. Choose the **RAMP** setting.

   Press the RAMP TOGGLE key one or more times to select the ramp time. Options include .5, 1.0, 1.5, and 2.0 seconds. The ramp time is applied to both the start and to the end of the contraction and the ramp time is in addition to the contraction time itself. A ramp setting is not applied to the Continuous duty cycle except when using a probe. With a probe treatment set to a Continuous duty cycle, a ramp time of 3 seconds is applied.

5. Choose **HIGH or LOW** pulse rate range.

   Press the HIGH/LOW TOGGLE key one or more times to select the high range only or the low range only (this toggle key is found next to the IFC/PREMOD key). The lights next to the toggle key show which selection is active. In a High Volt treatment, High or Low only must be selected (the combined High/Low option is not available for High Volt).

> Default High and Low pulse rate ranges for High Volt:
>
> The HIGH range is 80 to 120 Hz.
> The LOW range is 1 to 10 Hz.
>
> These ranges may be changed for a single treatment if desired, or new default settings may also be saved to apply to all future treatment setups.

6. Change the **PULSE RATE RANGE** (optional)

   You may change the pulse rate settings for the High or Low range, if desired. <u>You may only change the pulse rate range before pressing START to begin the treatment.</u>

   When you modify the settings, they will remain in effect for the duration of the treatment. If you save defaults during this treatment, the new settings you have entered become the defaults for High Volt. However, if you do not save the new settings, the unit will return to the current default settings for the next treatment.
   First press the TIME TOGGLE key to select RATE. The RATE light will become GREEN and you will see the current pulse rate range settings displayed in the TIME and the POWER-INTENSITY displays as shown in the diagram below. Next, press the HIGH/LOW TOGGLE key to select either the HIGH or the LOW range (this is found next to the IFC/PREMOD key). With RATE selected and either the HIGH or LOW range selected, you may use the TIME UP/DOWN ARROW keys to change the upper and lower limits of the range chosen. If you set both displays to the same value, the treatment will be delivered at that single pulse rate rather than sweep through a range.

When you are finished setting the pulse rate range, press the TIME TOGGLE key to return to the TIME display. After 10 seconds with no key presses, the TIME display automatically returns.

7. Change the treatment **TIME**, if desired.

   To change the treatment time for an **electrodes** treatment, use the TIME UP/DOWN ARROW keys. Be sure that the TIME LED located below the TIME display window is lighted when you make this change. The TIME TOGGLE key allows you to choose the desired option.

   For a **probe** treatment, the TIME display shows zero until you begin treating. After pressing the START key on the faceplate of the device, press the ON/OFF button on the probe to initiate the flow of current. The device beeps once and the timer then counts up from zero (in seconds) allowing you to time the delivery of current to each treatment site. When you press the button on the probe to STOP the current, the device beeps twice and the timer resets to zero.

8. Raise the **INTENSITY** to the desired level.

   Remember, when you increase intensity, current to the patient begins. Therefore, you should proceed to press START immediately after setting the intensity to begin the treatment timer. NOTE: The intensity arrows on the probe handle work the same as the intensity arrows on the device.

   Never use High Volt to treat any conditions which contribute to loss of sensation, and never use High Volt to treat an area where the patient cannot feel the electrical stimulation.

9. Press **START.**

   Press START to begin an electrodes treatment. When you press start, the treatment timer begins counting up.

   Press START on the device followed by ON/OFF on the probe handle to activate a probe treatment. The timer will begin counting up. If you fail to set the intensity on either an electrode or a probes treatment before pressing START, the intensity display will begin flashing, and you will be unable to start the treatment until you set the intensity.

   NOTE: SAVE DEFAULTS. If the treatment you have just set up is the most common High Volt setup you use, the treatment parameters can be saved as the defaults for your own device. After setting up the treatment, simply press and hold the START key for two seconds. At the end of two seconds, you will hear a beep indicating the treatment parameters have been saved. The next time you select this modality, these parameters are selected automatically.

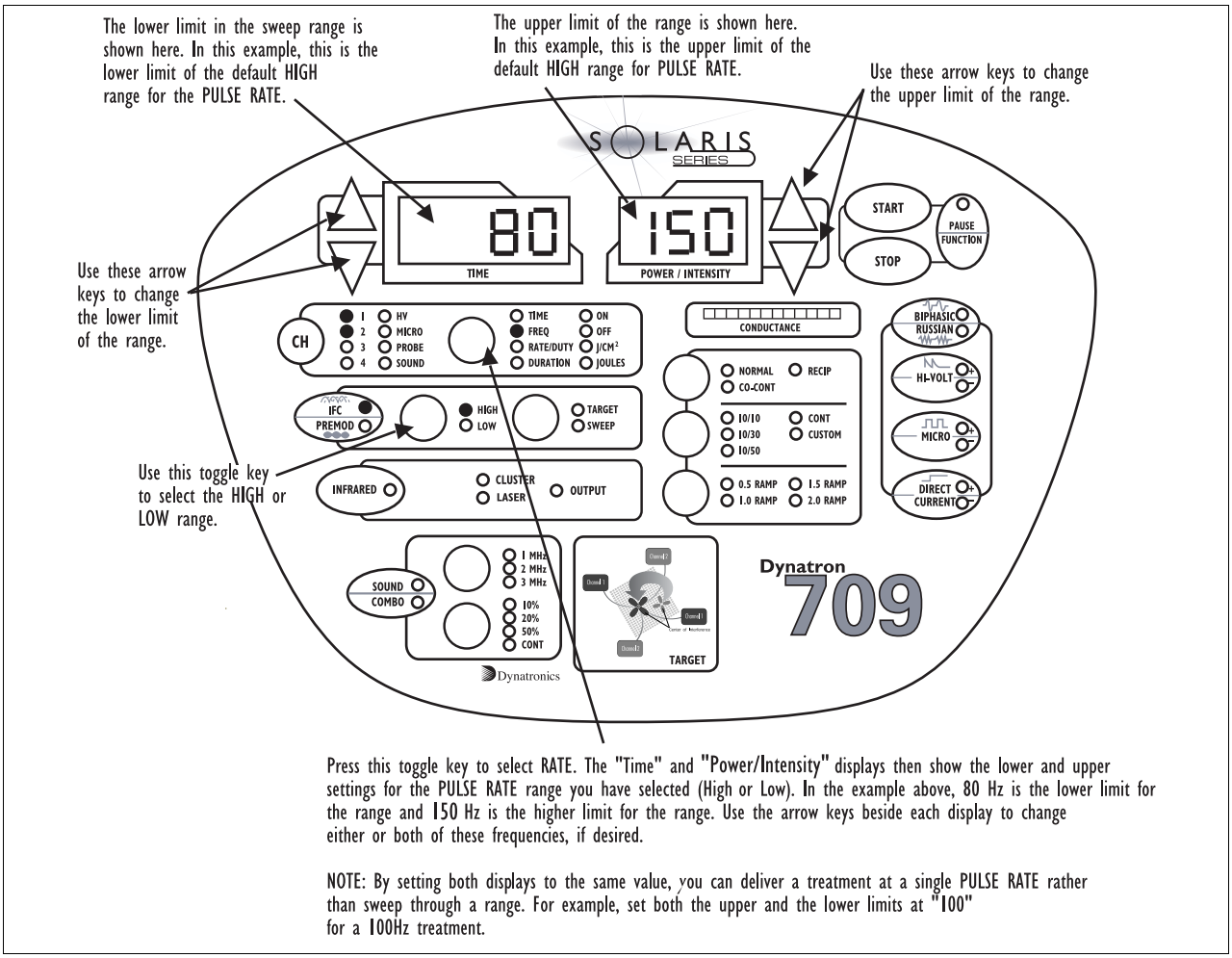
10. **MODIFY** settings.

    While the High Volt treatment is in progress, you can modify the following treatment parameters.

    - Use the CONTRACTION/REST CYCLE TOGGLE keys to select a different **CONTRACTION/REST CYCLE.**
    - Use the RAMP TOGGLE key to select a different **RAMP TIME**.
    - Use the FUNCTION-HI VOLT keys to change the **POLARITY** for a Pad treatment. This feature is not available when using the multi-stim probe.

- Use the TIME ARROW keys to increase or decrease the **TREATMENT TIME** on an electrode treatment.
- Use the POWER/INTENSITY ARROW keys to increase or decrease the **INTENSITY**.

<u>You can not change from High to Low (or the reverse) once a treatment has started</u>.



Pulse Rate Range Selection

11. Press **STOP**, if it is necessary to end the treatment before the treatment time has expired. NOTE: Pressing STOP will terminate all active treatments.

    When the treatment time has elapsed, current to the patient is stopped and a tone sounds signaling the end of the treatment. Treatments in progress may be stopped at any time using one of the following methods.

    ALL STOP: Press the STOP key to stop treatment at all channels. You may prefer to stop treatment at one channel only (see explanation below).

    STOP ONE TREATMENT ONLY: If you have more than one treatment in progress, you can stop one treatment by either of the following methods. First, press the CHANNEL TOGGLE key to select the channel to be stopped (that channel's light is GREEN when selected).

FUNCTION-STOP. Press and hold the FUNCTION key and press STOP to terminate the selected treatment.

REDUCE THE TREATMENT TIME TO ZERO during an electrodes treatment. Press the TIME DOWN ARROW until the TIME display reaches zero. The device beeps when the time reaches zero.

MULTISTIM PROBE STOP. A probe treatment may be stopped by pressing the ON/OFF key located on the handle of the MultiStim probe. The output at the selected channel is stopped, and the device then displays the parameters for the next treatment that remains in progress (if any).

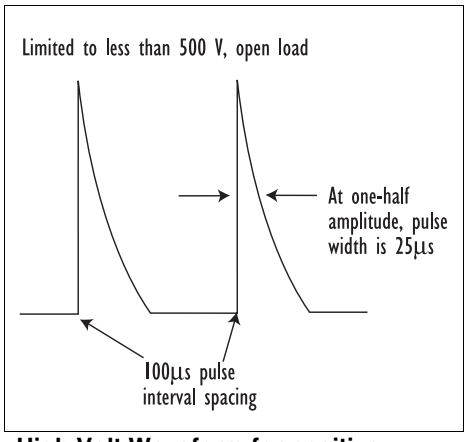
High Volt Modality Information

High Voltage pulsed stimulation is a pulsed DC current with pulse durations in the microsecond range and pulse rates ranging from 1 to 200 Hz, with a peak amplitude of up to 1.0 A utilizing a twin-peak monophasic waveform.

The Dynatron Solaris High Volt treatment setup uses the dedicated channel labeled. Each treatment utilizes the single HV channel with one or more active electrode and a large dispersive electrode. Electrodes are placed on opposite sides of the affected area so treatment is "through" the affected area. The Dynatron MultiStim probe is available to accommodate hands-on treatment delivery.

High Volt Waveform

The High Volt waveform is a twin-peak monophasic decaying waveform with either positive or negative polarity.



High Volt Waveform for positive polarity

High Volt Settings

High and Low Sweep Pulse Rate. The user may select High (80-120 Hz) or Low (1-10 Hz) frequency ranges. During a treatment, the device scans through the range of frequencies selected. The settings for these pulse rate ranges may be modified and saved by the user. The available range is 1 to 200 Hz.

Single Pulse Rate. The pulse rate may be set to a single pulse rate instead of a range. The pulse rate is selected from a range of 1 to 200 Hz.

Selectable Polarity. Positive or Negative monophasic current may be selected. You may also select both positive and negative and the current delivered alternates between the two polarities. Note: Dual Polarity is not available with a probe treatment.

Selectable Duty Cycle. Continuous or on/off duty cycles may be selected. The Dynatron Solaris allow you to choose a muscle contraction/relaxation cycle from options of 10/10 (ten seconds on and ten seconds off), 10/30, 10/50, or continuous cycle. A new feature is the Custom cycle which allows you to select from an ON time form 3 to 20 seconds, and an OFF time from 3 to 120 seconds. The OFF time cannot be less than the ON time.

Selectable Ramp Speed. You can choose a ramp speed of 1/2 to 2-1/2 seconds in half-second increments. For patient comfort, the ramp occurs both before and after the "On" segment of the pulse.

Pulse Duration. The pulse duration is fixed at 25 µs.

Pulse Pair Interval. The interval between the two pulses in the wave form is fixed at 100 µs.

Intensity Display in Volts. The intensity display is shown in volts (peak voltage with no load) with a range of 1 to 500.

High Volt Default Settings

The following default settings are set by the manufacturer and are selected when you choose High Volt. You may change these defaults to your own preferred settings. See "Setting Defaults" in this manual.

- High Volt Pads Treatment
- Continuous Duty Cycle
- Treatment Time Electrodes: 10 minutes
- Treatment Time Probe: 0.00
- Polarity: Negative
- Pulse Rate: High Range
  Default High Range: 80-120 Hz
  Default Low Range: 1-10 Hz
  Available Range: 1-200 Hz

High Volt Waveform Specifications

Waveform:	Twin peak, monophasic
Pulse Duration:	25 µs
Pulse Rate Range:	1 to 200 Hz
Pulse Interval:	100 µs
Maximum Power Output:	Limited to less than 500 V, open load

Microcurrent Instructions

Microcurrent treatments may be delivered using either electrodes or the MultiStim probe. If you are not familiar with the operation of the probes see "How to Use the MultiStim Probe" later in this section. For treatment with electrodes, plug one lead into the CHANNEL 1 JACK, and place the two electrodes on the patient before setting up the treatment. For treatment with probes, plug the Dynatron MULTISTIM PROBE into the STIM PROBE JACK located on the left side of the device.

During the Microcurrent treatment the current is delivered to both CHANNEL 1 and to the MULTISTIM PROBE output simultaneously. Therefore, CHANNEL 1 is unavailable for any other treatment while any Microcurrent treatment is in progress (including a single Microcurrent probe treatment).

NOTE: Microcurrent is unavailable if Direct Current or a Dynatron Light Therapy treatment is selected.

How To Use The MultiStim Probe For Microcurrent Treatments

To set up a Microcurrent Probe treatment, use the end of a cotton swab (such as a Q-Tip®) inserted into the end of both the MultiStim probe (active) and Microcurrent Ground probe. Cut the end of the swab to a short length. The cotton must touch the metal ring at the tip of the probe. Use a conductive electrolyte spray or water to wet the cotton swab before treating. If the cotton dries out during treatment, conductance may become erratic. Re-wet the cotton, if needed. **Note: When applying a Microcurrent probe treatment, it is necessary to use either a ground probe or a ground electrode in conjunction with the active MultiStim probe.** Attach the banana plug ground wire from the MultiStim probe by plugging it into the back of the ground probe. To use a ground electrode you must use a banana-to-pin adapter to connect the ground wire to the electrode.

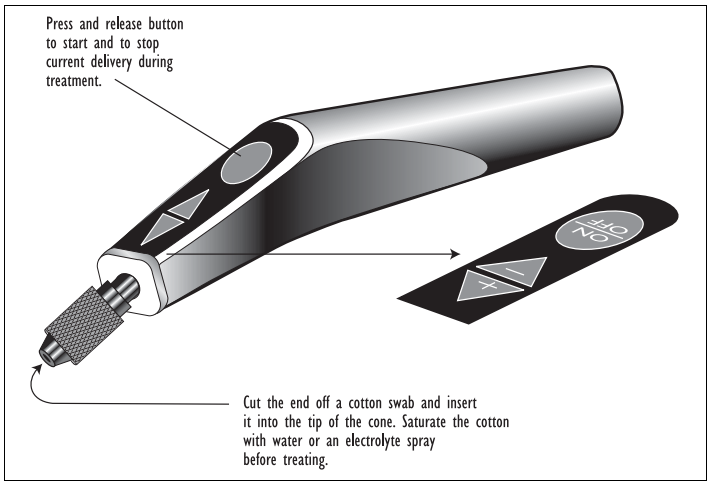
ACTIVE PROBE: To deliver the current to the patient through the active MultiStim probe, first set up the probe treatment and press Start. Then hold the probe as you would hold a pencil, and press the ON/OFF button on the probe to start delivery of the current. The active probe should touch the patient's skin at the treatment site, and the ground probe should touch the patient's skin elsewhere near the treatment site. This completes the circuit and delivers current to the patient. You do not need to hold the ON/OFF button down. Once you have pressed and released the button, the current is delivered until you press and release the button again to stop the current. The unit beeps once when you press the button to start the current, and beeps twice when you press the button to stop the current.

While you are delivering current, the treatment timer counts up in seconds from zero. When the current is stopped, the timer returns to zero. Press the ON/OFF button again to commence the next treatment cycle. Continue in this way until treatment is completed.

GROUND PROBE: The ground probe is used to complete the circuit allowing the flow of current through patient tissue. The ground probe should touch the patient's skin at any location away from the treatment point. As an alternative, you may also use a dispersive electrode as explained below. With the ground electrode you do not need to hold the ground probe in your hand during treatment. This is particularly convenient when treating in several different places around one point.

GROUND ELECTRODE: You can use an electrode in place of the ground probe. Just unplug the ground probe from its cable, attach a banana to pin adapter to the cable, then attach an electrode to the pin. Place the electrode on the patient at a site where it will not interfere with placement of the active probe during treatment.

TREAT: After pressing START on the faceplate of the device, press and release the ON/OFF button on the active MultiStim probe to start current delivery. The unit beeps once to indicate current delivery has started. When the active MultiStim probe and a ground probe touch the patient's skin, the current is delivered to the patient.


Press and release button to start and to stop current delivery during treatment.
ON OFF
Cut the end off a cotton swab and insert it into the tip of the cone. Saturate the cotton with water or an electrolyte spray before treating.
MultiStim Probe

Observe conductance by listening to the audio tone. In addition, the CONDUCTANCE BAR GRAPH will indicate the conductance between patient skin and probe tip, allowing for an optimum treatment.

TEST Mode: Press and release the ON/OFF button again to stop delivery of the current. The unit beeps twice to let you know current delivery has stopped. The probe is now in "TEST" mode allowing you to continue monitoring conductance at any point desired. When the probe touches the patient's skin, conductance continues to be measured and the audio tone is produced. Press and release the button when you wish to return to the TREAT mode.

NOTE: In "TEST" mode during a Microcurrent treatment, a small amount of current is delivered to allow an impedance reading to be taken in order to show conductance. The current delivered during "TEST" mode is either 25 micro amperes or the micro amperage setting for the treatment itself, whichever is less. For purposes of this measurement, current is delivered in pulses of approximately 20 mSec.

Basic Microcurrent Setup

1. Press the **MICRO** key.
2. The Solaris device will automatically choose treatment **CHANNEL 1** for electrodes.
3. For a **PROBE** treatment, use the TIME CHANNEL TOGGLE key to select PROBE, and insert the MultiStim probe into the STIM OUTPUT jack.
4. Choose the **POLARITY** (press FUNCTION key and MICRO key simultaneously)**.**
5. For electrode treatments only, change the **TIME** by using the TIME ARROW keys, if desired.
6. Change the **FREQUENCY**, by pressing the TIME TOGGLE key until the FREQ selection is lighted, then using the TIME ARROW keys, select the desired frequency.
7. Change the **INTENSITY** setting, by using the POWER/INTENSITY ARROW keys or the (+) & (-) switch in the probe handle, if desired.
8. Press **START.** The AUDIBLE TONE is selected as a default for a probe treatment.

9. Press MICRO again to turn **AUDIBLE TONE** on/off, as desired. Press Function-Time Toggle to turn on/off the Conductance Bar.
10. Press **STOP** if you need to stop a treatment before the treatment time is complete (stops all current treatments). Use the TIME arrow keys to bring treatment time to zero or press the FUNCTION and STOP KEY together to stop only the individual displayed treatment. PAUSE a Microcurrent probe treatment by pressing the ON/OFF key located on the MultiStim probe handle.

Microcurrent Treatment Time

- All probe treatments are manual, and a treatment time is not set. During the probe treatment, the timer will start at zero and count UP in SECONDS when current is ON, and will return to zero when current is stopped. You must press START on the device face plate to begin the treatment and automatically activate the tone before you begin the treatment. Then press the ON/OFF button on the probe to start and stop delivery of current. Press STOP (stops all therapies currently running) or Function-Stop (stops only Microcurrent or treatment in focus) to terminate Micro probe treatment.
- Electrode treatments are timed, and a treatment time in MINUTES is entered at the start of the treatment. The timer counts DOWN for electrode treatments.

Detailed Microcurrent Setup

Before setting up a Microcurrent treatment with electrodes, attach a lead wire with two electrodes to CHANNEL 1 or, for a probes treatment, connect the MULTISTIM PROBE to the STIM OUTPUT JACK on the left side of the device. When a MULTISTIM PROBE treatment is in progress, Channel 1 is not available for any other use.

1. Press the **MICRO** key.

   When you press the MICRO key, the default settings are automatically selected. If you wish to use the default settings, you can now simply press START. If you wish to use other settings, complete steps 2-6.

2. Choose the output desired, select **CHANNEL 1** (for electrodes treatment). For a probe treatment, press the CHANNEL TOGGLE to select PROBE (the green LED will be lighted) and insert the MULTISTIM PROBE into the STIM PROBE JACK.

3. Choose **POLARITY.**

   While holding the FUNCTION key, press the MICRO key at the same time to select the desired polarity. Press once to select positive ("+"), press again to select negative ("-"), and press again to select dual polarity (both "+" and "-" LEDs are lighted). When both positive and negative are selected, the resulting bipolar waveform includes both a positive and a negative phase.

4. For electrode treatments only, change the **TIME**, if desired.

   To change the treatment time, use the TIME UP/DOWN ARROW keys. Be sure that the TIME LED located below the TIME display window is lighted when you make this change. The TIME TOGGLE key allows you to choose the desired option.
   For probes treatment, the TIME display shows zero until you begin treating. After pressing the START key on the faceplate of the device, press the ON/OFF button on the probe which will initiate the flow of current. The device beeps once and the timer then

counts up from zero (in seconds) allowing you to time the delivery of current to each treatment site. When you press the "1/0" key on the probe to stop the current, the device beeps twice and the timer resets to zero.

5. Change **FREQUENCY**, if desired.

   To change the frequency, use the TIME TOGGLE key to select FREQ, next use the TIME UP/DOWN ARROW keys to change the frequency. You can press the TIME TOGGLE key again to return to the TIME display, if desired. However, if you make no key presses for 10 seconds, the display automatically returns to the TIME display.

6. Change the **INTENSITY** setting.

   This setting is displayed in micro amperes in the POWER-INTENSITY window. Use the POWER-INTENSITY Up/Down Arrow keys to change the intensity.

   For Electrodes treatments, the CHANNEL 1 indicator light is GREEN. For a probe treatment the MICRO channel light is GREEN and the CHANNEL 1 light is YELLOW. Changes you make will affect output to both the probe and Channel 1.

7. Press **START.**

   For electrode treatments, when you press START the treatment timer begins counting down and stim is delivered through Channel 1.

   For probe treatments, after pressing START you must press and release the ON/OFF button on the probe to activate current through the probe; the device beeps once to signal that current delivery has started (it is not necessary to hold the button down while treating). The treatment timer begins counting up in seconds from zero to provide a convenient means of timing the delivery of current at a given point. Press and release the ON/OFF button again to stop the current through the probe; the treatment timer returns to zero and the device beeps twice to signal that current delivery has stopped. Continue the treatment cycle in similar fashion for each treatment site. When applying a Microcurrent Probe treatment, it is necessary to use a ground probe or ground electrode in conjunction with the treatment.

   NOTE: SAVE DEFAULTS. If the treatment you have just set up is the most common Microcurrent setup you use, you can save the treatment parameters as new defaults for your own machine. After setting up the treatment, simply press and hold the START key for two seconds. At the end of two seconds, you will hear a beep indicating the treatment parameters have been saved. The next time you select the MICRO modality, these parameters are selected automatically. Separate default parameters may be saved for both treatments with electrodes and with probes. See "Setting Defaults" located at the end of this section of the manual for further instructions.

8. Turn **AUDIBLE TONE** ON/OFF, and/or adjust volume.

   The audible tone allows you to monitor conductance, if desired. As conductance increases (as resistance is decreased), the tone becomes higher in pitch.

   The audible tone is defaulted to ON for a probe treatment and OFF for electrodes treatments, but may be changed. After the Microcurrent treatment has started the MICRO key acts as a toggle key to turn the tone ON and OFF. Press MICRO to turn the tone ON or OFF.

   You may also adjust the tone volume after the treatment has started. To adjust the volume, PRESS and HOLD the FUNCTION key and at the same time use the POWER/INTENSITY ARROW keys to raise or lower the volume until a comfortable volume setting is found. The POWER/INTENSITY display will temporarily show an

incremental value (0-30) representing the volume selection. You must continue holding the FUNCTION key down while adjusting the volume. When you release the FUNCTION key, the POWER/INTENSITY display returns to its normal setting.

9. **MODIFY** a treatment in progress.

   While the treatment is in progress, you can modify the treatment parameters.

   - Press the FUNCTION-MICRO key to select a different polarity.
   - Use the TIME TOGGLE key to select TIME then use the TIME ARROW keys to increase or decrease the treatment time.
   - Use the TIME TOGGLE key to select FREQ, then use the TIME ARROW keys to increase or decrease the frequency.
   - Use the POWER/INTENSITY ARROW keys to increase or decrease the intensity.

10. Press **STOP**, if it is necessary to end the treatment before the treatment time has expired.

    When the treatment time has elapsed, current to the patient is stopped and a tone sounds notifying you of the treatment end. Treatments in progress may be stopped at any time using one of the following methods.

    ALL STOP: Press the STOP key to stop treatment at all channels. You may prefer to stop treatment at one channel only (see explanation below).

    STOP ONE TREATMENT ONLY: If you have more than one treatment in progress, you can stop one treatment by either of the following methods. First, press the CHANNEL TOGGLE key to select the channel to be stopped (that channel's light is GREEN when selected).

    FUNCTION-STOP. Press and hold the FUNCTION key and press STOP to terminate the selected treatment.

    REDUCE THE TREATMENT TIME TO ZERO. Press the TIME DOWN ARROW until the TIME display reaches zero. The device beeps when the time reaches zero.

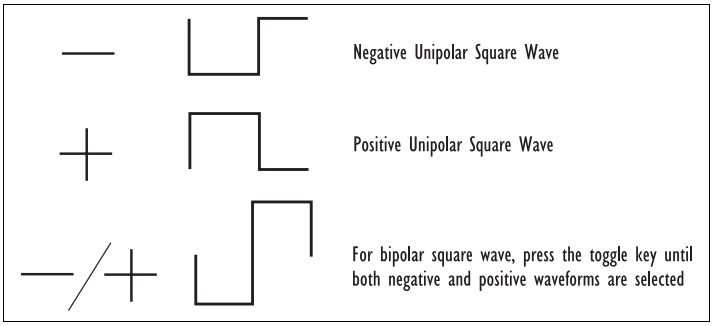
    The output at the selected channel is stopped, and the device then displays the parameters for the next treatment that remains in progress (if any).

Microcurrent Modality Information

Microcurrent is low-volt pulsed microamp stimulation which has been used for symptomatic relief of chronic intractable and post-surgical pain. With the Dynatron Solaris you can provide attended or unattended Microcurrent therapy. Unattended therapy is delivered using electrodes. Attended therapy is delivered using the Dynatron hand-held MultiStim probe. Due to the very low frequencies generally associated with a Microcurrent treatment, the current is commonly not felt by the patient. However, Microcurrent at high intensity settings or during a probe treatment, can sometimes be felt by the patient, and may even be uncomfortable. During a probe treatment, this is a result of current being concentrated at a very small area.

As with all forms of electrotherapy, current density is dependent upon the current setting, the intensity setting, the size and type of electrodes used, and conductance. Higher current density increases the possibility for patient discomfort. The current density can be reduced by decreasing the amount of current (intensity) or increasing the area through which the current is being delivered. The area can be increased by using larger electrodes and/or making sure that the total area of the electrode is actually delivering current.

Microcurrent Waveforms


Negative Unipolar Square Wave
Positive Unipolar Square Wave
For bipolar square wave, press the toggle key until both negative and positive waveforms are selected

Microcurrent Waveform

Three different output waveforms (polarities) may be selected with the Dynatron Solaris: The first two are unipolar square waves having a monophasic pulse at a 50 percent duty cycle (equal on and off times). In the illustration above, the first unipolar waveform has negative polarity only, and the second has positive polarity only. The third waveform is a bipolar (negative and positive) square wave with a 50 percent duty cycle.

Microcurrent Guidelines

When delivering Microcurrent therapy, observe the following guidelines:

1. Use only moderate current. Consult published literature for recommended settings for Microcurrent treatment.
2. When using Microcurrent probes, keep in mind that all of the current is delivered through the tip of the probe resulting in much higher current density than when using electrodes. Therefore, low to moderate intensity settings will be much more comfortable for the patient, especially when treating sensitive areas.

3. When using electrodes, ensure that the area on the patient's skin where the electrode is to be placed is clean and free of all foreign matter. This includes powders, perfumes, and the like, as well as body oils or dirt and grime. Cleaning with an alcohol wipe should be adequate. Allow the alcohol to fully evaporate before applying the electrodes. Iontophoresis occurs with all electrical current therapies, and can drive any above-surface contaminants below the epidural layer, where an allergic reaction may occur.
4. Make sure the electrodes being used are in good condition. The poly adhesive electrodes should have good adhesion over the entire surface area of the electrode. The area where the leads attach to the electrode (either the pin connector or a snap) should not be damaged such that the connection to the backing behind the adhesive is broken. Carbon electrodes should be deep black, and should be free of cracks in the electrode surface.
5. Some patients tend to be much more sensitive to Microcurrent treatments. On patients with this tendency, treat with reduced intensity and/or shorter treatment times, with possibly more frequent treatments, if required.
6. If electrodes are placed on an uneven skin surface, such as over a raised mole, the electrode may not adhere evenly over its entire surface and current could be intensified at the raised area, causing discomfort to the patient.

Microcurrent Default Settings

The following default settings are set by the manufacturer and are selected when you press Micro. You may change these defaults to your own preferred settings. See "Setting Defaults" in this manual.

Electrodes
The Microcurrent treatment setup with electrodes is the default, and the following defaults are also selected:

- Bipolar wave
- .3 Hz frequency
- 50 µA intensity
- Time: 20 minutes, counts down
- Audible Tone: Off

Probe
If Probe treatment is selected, the following defaults are automatically selected:

- Negative unipolar wave
- 4 Hz frequency
- 300 µA intensity
- Time: zero, counts up
- Audible Tone: On

Available Ranges:

- Frequency: Between .1 and 200 Hz
- Maximum (open circuit) Voltage: 60V
- Intensity: Between 10 and 990 microamps open load, constant current, increments of 10µA.

The ranges of .1 to 200 Hz frequency and between 10 and 990 micro amperes intensity are available for setting up both electrodes and probes treatments. For guidance in selecting the appropriate frequency and intensity for a given probes or electrodes treatment, consult published medical literature.

Direct Current Instructions

Direct Current flows in one direction. From a practical perspective, Direct Current can be defined as having a pulse duration long enough to depolarize skeletal muscle when the nerve is not intact. On the Solaris line of devices, Direct Current is a square wave interrupted with a set interpulse duration of 500 mSec. The interrupted treatment is delivered in a continuous train of 0 .1 mSec to 500 mSec pulses set at a maximum of 20 mA. Duration, Intensity, and Polarity settings may be adjusted separately, if desired. The Polarity may be set at Positive or Negative. Treatment is provided only through the MultiStim probe. The use of various attachments and a dispersive electrode are necessary. The MultiStim probe utilizes the Stim Probe Output Jack located on the left side of the Solaris device. ON/OFF controls and INTENSITY keys (+/-) are located on the MultiStim probe handle.

Direct Current Setup

1. Choose **DIRECT CURRENT**.
2. Plug the MULTISTIM PROBE into the STIM PROBE OUTPUT JACK and attach the dispersive electrode.
3. Choose **POLARITY.** Note: Polarity setting defaults to Negative.
4. Set the **DURATION** of each DC pulse.
5. Place probe tip in contact with patient's skin.
6. Press the **START** key followed by the **ON/OFF** key located on the MultiStim probe.
7. **RAMP UP INTENSITY** by using the POWER INTENSITY KEYS (+) and (-) keys located on the handle of the probe. Caution: Probe must be in contact with patient's skin prior to starting treatment.
8. Treatment will continue until the OFF key on the MultiStim probe is pressed.

Detailed Direct Current Setup

1. Press the **DIRECT CURRENT** key.
   When you choose DIRECT CURRENT, the STIM PROBE OUTPUT JACK is automatically selected.

2. Plug the MultiStim probe into the OUTPUT JACK and attach the dispersive electrode.

   The default settings for the modality are programmed at 100 mSec, and Negative polarity. If you wish to use the default settings, attach dispersive electrode and place probe in contact with the patient's skin. You can now press START on the device followed by the ON/OFF key on the MultiStim probe handle. There is no need to hold down the key. Current delivery will commence and you can begin ramping up the intensity by using the POWER INTENSITY (+) (-) KEYS located on the Probe handle until the desired muscle contraction is obtained.

If you wish to change the treatment settings, complete the steps on the following pages.

3. Set **PULSE DURATION**

   The default PULSE DURATION time is displayed at 100 mSec in the TIME display window. Use the TIME ARROW keys to increase or decrease the PULSE DURATION between 0.1 mSec and 500 mSec per pulse. Pulse Duration selections available are 0.1, 0.3, 0.5, 1, 10, 100, 500, with an interpulse duration of 500 mSec. The selected pulse duration will be delivered in a continuous train of pulses set up to a maximum of 20 mA.

4. Choose **POLARITY**

   Polarity for a DIRECT CURRENT probe treatment will default to Negative (-). You may change the Polarity setting by pressing the FUNCTION key and the DIRECT CURRENT key at the same time, then while continuing to hold down the FUNCTION key toggle the DIRECT CURRENT key to (+) Positive (the GREEN LED next to (+) will be lighted or back to (-) Negative (the GREEN LED next to (-) will again be lighted). Note: Polarity may be changed during treatment.

5. Place the probe in contact with the patient's skin before pressing START.

6. **START** the DC treatment by pressing the START key located on the faceplate of the device followed by pressing and releasing the ON/OFF key located on the MultiStim Probe handle. When the ON key is pressed, a single beep will be heard, followed by one beep every second as long as the DC current continues to flow.

7. **INTENSITY** defaults at "1." After the ON key has been pressed, begin ramping up the intensity by pressing the POWER/INTENSITY UP arrow key or by pressing the (+) (-) keys on the handle of the MultiStim probe. The INTENSITY may be set up to 20 mA. When the desired muscle contraction has been reached, press the ON/OFF key on the probe handle to end the treatment.

   Before selecting the intensity setting for an individual patient, see "Electrotherapy Usage Cautions" in this manual for recommended intensity settings. Also see the section of this manual entitled "Contraindications, Warnings, and Precautions" for specific precautions when treating any conditions contributing to loss of sensation, or **anytime the patient cannot feel the electrical stimulation.**

8. **STOP** the DC treatment by pressing and releasing the ON/OFF key located on the MultiStim Probe handle. When the ON/OFF key on the probe handle is pressed, two quick beeps will be heard indicating that the DC treatment is complete.
   SAVE DEFAULTS. If the treatment you have just set up is a frequently used treatment setup, you can save the treatment parameters as new defaults for your own machine. After setting up the treatment, simply press and hold the START key located on the Solaris device until you hear a beep indicating the treatment parameters have been saved. The next time you select that modality, these parameters are selected automatically.

   NOTE: The intensity setting is not saved but must be reset with each individual patient.

Direct Current Modality Information

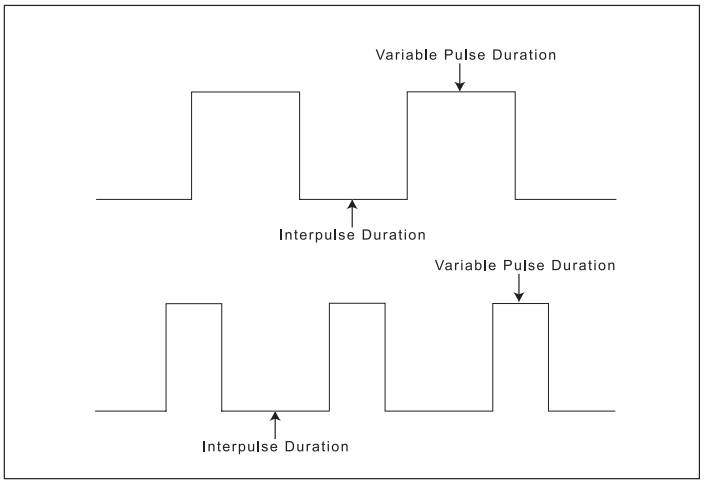
Direct Current is electrical current that flows in one direction. Direct Current has been clinically used for: 1) Performing strength duration curve tests, 2) Stimulating denervated muscle following peripheral nerve injury.

On the Solaris line of devices, Direct Current is a square waveform interrupted with a set interpulse duration of 500 mSec. The treatment is delivered in a continuous train of 0.1 mSec to 500 mSec pulses set at a maximum of 20 mA. Duration, Intensity, and Polarity settings may be adjusted separately, if desired. The Polarity may be set at Positive or Negative. Treatment is provided only through the MultiStim probe. The use of various attachments and a dispersive electrode are necessary. The MultiStim probe utilizes the Stim Probe Output Jack located on the left side of the Solaris device. ON/OFF controls and INTENSITY keys (+/-) are located on the MultiStim probe handle.

Direct Current Probes Therapy

The Dynatron Solaris Direct Current treatment setup uses the MULTISTIM PROBE with the STIM PROBE JACK as its dedicated channel. The treatment is normally delivered with a paddle adapter accompanied by a large dispersive electrode or ground probe acting to complete the circuit. Note: Electrodes and Probe must be in contact with the patient prior to beginning therapy.

Direct Current Waveforms



Direct Current with Variable Pulse Duration Times

The Direct Current wave form is a square wave with adjustable duration times. Duration will default to 100 mSec, but may be set from 0.1 mSec to 500 mSec. Duration selections available are 0.1, 0.3, 0.5, 1, 10, 100, 500, with an interpulse duration of 500 mSec. The variable Pulse Duration is interrupted with a interpulse duration of 500 mSec.

Note: Load impedance does not affect output of the waveform.

Direct Current Cautions

It is important that excellent coupling be maintained any time current is flowing. Increased resistance from poor coupling or excessive current density can cause skin reactions.

CAUTION: Electrodes must be attached and probe placed in contact with the patient's skin prior to starting the treatment.

Note: Direct Current tends to lower surface sensory perception as the treatment proceeds. The patient must have good sensory perception if Direct Current is to be used.

Direct Current Default Specifications

Direct Current Specifications

- Waveform: Square
- Pulse Duration: .1-500 mSec
- Pulse Duration Selections: 0.1, 0.3, 0.5, 1, 10, 100, 500
- Inter-Pulse Duration: 500 mSec
- Power Output: 20 mA.
  Note: Load impedance does not affect output of the DC waveform.

Direct Current Default Settings

The following default settings are set by the manufacturer and are selected when you select a DIRECT CURRENT PROBE treatment. You may change these defaults to your own preferred settings. See “Setting Defaults” in this manual.

Direct Current Default Settings

- Pulse Duration: 100 mSec
- Polarity: Negative
- Intensity: 1

Infrared Light Therapy Operating Instructions

Utilizing state-of-the-art technology, the new Dynatron Solaris devices deliver therapeutic energy through one of four innovative Solaris treatment probes or the new Dynatron Xp Infrared Light Pad.

The Solaris Infrared Light Therapy probes are specifically designed for treating smaller areas. The probes have a treatment area of 5 cm^2 and should be applied in direct contact with the surface of the skin over the treatment area. To treat areas larger than 5 cm^2, individual treatments should be given one at a time in a grid pattern until the desired treatment area is covered unless treating large areas where the Dynatron Xp (8"X10") pad would be more suitable. Please see published literature for specific treatment parameters.

There are five accessory treatment options:

- D880 INFRARED CLUSTER PROBE: The Solaris D880 Infrared Cluster Probe is designed with 32 infrared super luminous diodes emitting a wavelength of 880nm and 4 red diodes emitting a wavelength of 660nm.
- D880 PLUS INFRARED CLUSTER PROBE: The Solaris D880 Plus Infrared Cluster Probe is identical to the D880 probe with the exception of the power that is delivered. The D880 Plus probe has a maximum power output of 900mW compared to the maximum power output of the D880 probe of 500mW, thus reducing total treatment time.
- D890 INFRARED LIGHT PROBE: The Solaris D890 Light Probe incorporates one laser diode emitting a wavelength of 875nm and 3 red diodes emitting a wavelength of 660nm.
- D405 INFRARED/BLUE LIGHT PROBE: The Solaris D405 probe is an Infrared Light probe designed with 8 Infrared diodes emitting a wavelength of 880 nm and 28 Blue diodes emitting a wavelength of 405nm.
- DYNATRON Xp INFRARED LIGHT THERAPY PAD: This unattended Infrared Light Therapy Pad consists of 200 infrared diodes emitting wavelengths of 880nm. The Xp's flexibility makes it easy to treat any part of the body. A Booster Box is required when using the Dynatron XP Infrared Light Pad.

The Solaris Infrared Light Therapy Probes and the Dynatron Xp Pad have been cleared by the FDA *to provide topical heating for temporary increase in blood circulation, temporary relief of minor muscle and joint aches, pain and stiffness and relaxation of muscles; for muscle spasms and minor pain and stiffness associated with arthritis.*

CAUTION: The Solaris Light Therapy probe and the Dynatron Xp Pads must be plugged securely into the respective output jacks prior to turning ON the Solaris base console or Booster Box.

WARNING: Exposure to Blue Light poses an optical risk. Protective eyewear is therefore required when using the D405 probe.

Infrared Light Therapy Treatment Setup

1. **Remove all gels and lotions from skin surface.**
2. **Booster Box:** If using a Booster Box, plug the Booster Box communication cable into the base of the Solaris Console while power to the Booster Box and the console are OFF.
3. **While the Solaris console/Booster Box devices are turned OFF**, plug the Light Therapy Probe and/or Xp Pad into the corresponding output jacks on the Solaris console or Booster Box.
4. When using the D405 probe, place protective eyewear on both the patient and the practitioner.
5. **Turn ON the Solaris/Booster Box devices.**
6. Select **LIGHT THERAPY** on the Solaris console.

   Probe. The PROBE LED is lighted and the device is in Light Probe mode.

   Pad. Press the CH toggle key. The PROBE LED will go off and the device is in Light Pad mode. D701: Press the UP ARROW key next to the TIME display window.
7. Select **TREATMENT SETTINGS:** Frequency/Rate Duty (probe only) and Dosage.
8. **START.** Press START on the faceplate of the device.

   Pad. The Light Pad treatment will immediately begin when START is pressed.

   Probe. Press the 1/0 (**ON/OFF)** key located on the Probe handle to begin treatment.
9. **PAUSE.**

   Pad. Press the Pause/Function key located on the face plate of the Solaris console. To continue the treatment, press the Pause/Function key again.

   Probe. Press the 1/0 (**ON/OFF)** key located on the Probe handle. To continue the treatment, press the 1/0 (**ON/OFF)** key again.
10. **STOP.**

    Pad. Press the FUNCTION and STOP KEY simultaneously to stop only the displayed pad treatment or allow the treatment to automatically time out.

    Probe. Treatment will continue until the 1/ 0 (**ON/OFF)** key on the Light Therapy Probe is pressed, pausing the treatment or the treatment automatically times out.

    CAUTION: Pressing STOP on the faceplate of the device will terminate all Solaris treatments in progress.

Detailed Treatment Setup

1. **CLEANSE THE TREATMENT AREA** to insure that all gels and lotions have been removed from the surface of the skin. DO NOT use gels in combination with light therapy. Using gels will degrade the optical coating on the lens resulting in a loss of output power and efficacy. Gels will clog the vents causing overheating and damage to

the internal components. Damage caused by the use of gels and lotions may void your warranty.

2. If using the **Dynatron XP Pad**, attach the Booster Box to the Solaris base console by plugging the Booster Box communication cable (labeled SOLARIS CONNECTION) into the IR/RED output jack located on the right side of the Solaris unit. When connecting the Booster Box, both units should be turned OFF.

3. **WHILE THE BASE SOLARIS/BOOSTER BOX UNITS ARE <u>TURNED OFF</u>,** insert the Solaris Light Therapy Probe and/or Dynatron Xp Pad into their proper output jacks. The Light Therapy Probe should be inserted into the IR/RED Probe output jack located on the base console of the Solaris device, or on the left side of the Booster Box. The Xp pad should be plugged into the Xp Pad output jack located on the right side of the Booster Box. Carefully align the connector "keys" to avoid damage to the pins when inserting the probe/pad into the jack(s).

4. When using the D405 probe, place protective eyewear on both the patient and the practitioner.

5. **POWER-ON THE DEVICE(S).** After the pad and/or probe are plugged into the proper output jack(s), select the "1" (ON) position on the power switch(s) located on the rear panel(s) of the base console and the Booster Box (if applicable). If a probe or pad has not been properly attached, an error message "Irhd" will appear in the time display window indicating that the devices must be turned OFF and the probe/pad connections carefully checked. It is recommended, if the pad/probes are used frequently, that the unit remain ON with the Solaris Light Therapy devices plugged into the Solaris console/Booster Box throughout the day. When switching to a different probe/pad, turn the Solaris console/Booster Box OFF and repeat step 2 above.

6. Select **LIGHT THERAPY** on the Solaris console.

   Probe. The PROBE LED is lighted and the device automatically defaults to the Infrared Light Probe mode. The probe is activated in preparation for treatment.

   Xp Pad. After pressing Light Therapy, press the CH toggle key. The PROBE LED goes off and the device is in Pad mode. To place the D701 in Pad mode, press the UP ARROW key next to the TIME display window.

   CAUTION: The Xp Light Pad should not be flexed smaller than a 5" diameter. Applying flexion that forces a diameter smaller than 5" may cause the pad to fail.

7. **SET DOSAGE (Total Energy Delivered)**
   Dosage is calculated as a combination of time and Joules/cm^2. Dosage may be selected by pressing the UP/DOWN ARROW keys located next to the POWER/INTENSITY display window to increase or decrease the desired number of J/cm^2 for the prescribed treatment protocol. For further instructions for the Xp Pad treatment setup, proceed to step 8 after setting the dosage.

Note: TIME is automatically calculated by the device. Treatment time can only be adjusted by altering the dosage. Dosage cannot be changed during a treatment.

8. **CUSTOMIZING PROBE TREATMENT SETTINGS**
The user has the capability of customizing the DOSAGE, FREQUENCY and RATE/DUTY CYCLE for Probe treatments. However, the user will not be able to select the FREQUENCY setting until after the RATE/DUTY cycle is changed from a Continuous setting to one of the other RATE/DUTY choices.

RATE/DUTY
For both CLUSTER and LASER probes, press the TIME TOGGLE KEY to select RATE/DUTY. By pressing the TIME ARROW keys next to the TIME display, the user may select one of four available RATE/DUTY cycles that will appear in the TIME display window.

90% 10%
50% Continuous

After selecting the customized RATE/DUTY cycle, the FREQUENCY will automatically default to 5,000 Hz but will not be displayed in the TIME display window until after the user presses the TIME TOGGLE key to select FREQ.

FREQUENCY
Frequency can be modified by pressing the TIME TOGGLE KEY to select FREQ. The GREEN LED next to FREQ will be lighted. Using the UP/DOWN arrow keys located next to the TIME display window, the user may set the treatment Frequency displayed in the window from 0-9999 Hz. Frequency will change in multiples of 10 from 10 to 100 and from 100 to 9999 in increments of 100.

Note: Altering the frequency causes the light to pulse (to turn on and off) at a set duty cycle of 50% resulting in the pulsed light being on and off the same amount of time. The higher the frequency, the faster the light will pulse. If the frequency is set above 60 Hz, the pulsing of the light will no longer be visible to the human eye.

SAVING NEW DEFAULT SETTINGS
The user can now save the newly programmed settings as the default settings for future treatments by pressing the START key and holding it down until the sound of a beep is heard. Otherwise, the device will return to the original default settings once the treatment is complete.

8. Press **START** on the faceplate of the Solaris console.

Xp Pad. The Infrared Pad treatment will immediately begin when START is pressed. The GREEN OUTPUT LED on the Solaris face place will be lighted and the treatment time indicated in the TIME display window will begin counting down. When the treatment time has counted down to "0," a tone will sound, alerting the practitioner that the treatment is complete. Another cycle of the same duration may be activated by again pressing the START key.

Probe. After pressing START, the YELLOW LED on the PROBE will be lighted indicating that there is power to the probe. Press the 1/0 (**ON/OFF**) toggle key located on the Probe handle to begin treatment, the GREEN LED on the probe handle will be lighted and the treatment time indicated in the TIME display window will begin counting down to zero. While treatment is in progress and in focus, the LED next to OUTPUT and the PROBE LED on the device faceplate will also be lighted GREEN. When switching to another focus, the PROBE LED on the console faceplate will change to ORANGE.

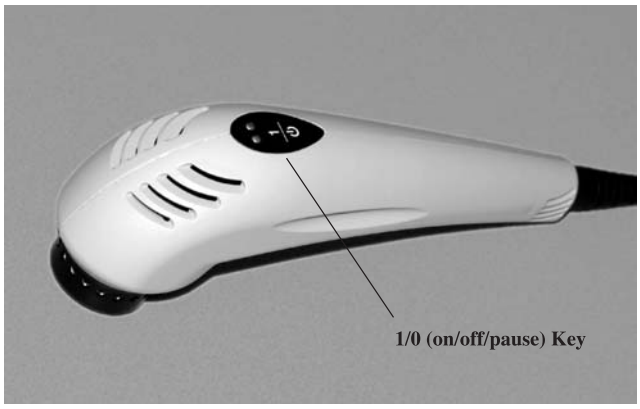
When the countdown reaches zero a tone will sound and the GREEN LED on the Solaris Light Therapy Probe handle will turn off and the YELLOW LED will be lighted. The OUTPUT LED on the device will go OFF, indicating that the treatment has terminated. Another cycle of the same duration may be activated by pressing the 1/0 (ON/OFF) key on the probe handle.

CAUTION: The vents surrounding the treatment head should be clear and free of any obstruction during treatment. Never use gels or lotions with a light probe treatment. Expect to hear the probe fan go on and off during treatment as the fan is designed to maintain a consistent internal probe temperature. If for any reason the internal temperature of the probe exceeds set limits, the word "HOT" will appear in the TIME DISPLAY window and the treatment will be automatically PAUSED until the internal probe temperature returns to prescribed limits.

9. **PAUSE.**

Xp Pad. With Light Therapy as the focus modality, press the Pause/Function key located on the face plate of the Solaris console to PAUSE an Xp Light pad treatment. To continue the treatment, press the Pause/Function key again.

Probe. Press the 1/0 (**ON/OFF)** toggle key located on the Probe handle to PAUSE and RESTART a treatment at any time. When the treatment is active, the GREEN LED on the handle of the probe will be lighted. When the treatment has been PAUSED or is OFF, the YELLOW LED on the handle will be lighted. The treatment will STOP when the time reaches "0" and the sound of a beep is heard.



10. **STOP**.

Xp Pad. A Light Pad treatment may be stopped by pressing the FUNCTION and STOP KEY simultaneously while Light Therapy is the focus treatment

Probe. Treatment will continue until the1/ 0 (**ON/OFF)** key on the Light Therapy Probe is pressed, pausing the treatment, or the treatment automatically times out.

CAUTION: Pressing STOP on the faceplate of the device will terminate all Solaris treatments in progress and reset the device to the preset default values.

When the Dynatron Booster Box is operational and a Probe treatment has timed out, the PAUSE/FUNCTION and STOP keys must be pressed simultaneously to exit the Infrared Light Probe Mode, prior to switching to an Infrared Light Pad treatment. The same is true (press PAUSE/FUNCTION and STOP keys) following a Pad treatment and returning to the Probe mode.

Infrared Light Therapy Treatment Notes

- If the treatment area is larger than the size of the Probe aperture, then areas equal in size to the aperture should be treated one at a time until the entire area is covered**. Do not attempt to "bathe" the area by moving the Probe back and forth or in some other manner over the target area. Failure to make full contact with the treatment surface may result in outcomes that are less effective.** Other methods may reduce total energy absorption. If the area is large, the 8"X10" Dynatron Xp Pad may be a more appropriate treatment option.
- When treating the patient, the Infrared Light Therapy Probe/Pad should be placed on the skin over the treatment area. Maintaining constant contact with the skin is essential during treatment. Before beginning each treatment, the skin area and the probe/pad should be carefully cleaned to avoid skin irritation or infection.
- Cleanse the probe after each use with a dry cloth. **Never use water or cleansing agents on the Light Therapy Probe aperture.** Caustic cleansers (even liquid cleaners and solvents) will cause chemical interactions with the lens coating. **The probe may be gently wiped with a clean cloth lightly dampened with Isopropyl Alcohol when a disinfectant is required.**
- Cleanse the Dynatron Xp Light Therapy Pad by gently wiping the surface with a mild soap on a dampened soft cloth. **Never immerse the pad.** Caustic cleansers, solvents, or alcohol should never be used on the pad's surface.
- Cleanse the treatment area thoroughly in order to remove all gels and lotions.
- **DO NOT use gels in combination with Light Therapy. Using gels will degrade the optical coating on the lens resulting in a loss of output power and efficacy. Gels will clog the vents causing overheating and damage to the internal components.**
- **DO NOT attempt to unscrew or tighten down the bezel that holds the probe lens in place. This is not a threaded part.**

NOTE: This therapy must be used cautiously where sensory nerve damage is present or in any case where there is a loss of normal skin sensation; including areas desensitized by medication or other therapies such as any type of cryotherapy

Infrared Light Therapy Modality Information

The Solaris Infrared Light Therapy Probes and the Dynatron Xp Pad have been cleared by the FDA *to provide topical heating for temporary increase in blood circulation, temporary relief of minor muscle and joint aches, pain and stiffness and relaxation of muscles; for muscle spasms and minor pain and stiffness associated with arthritis.*

Infrared Light Therapy Basic Vocabulary

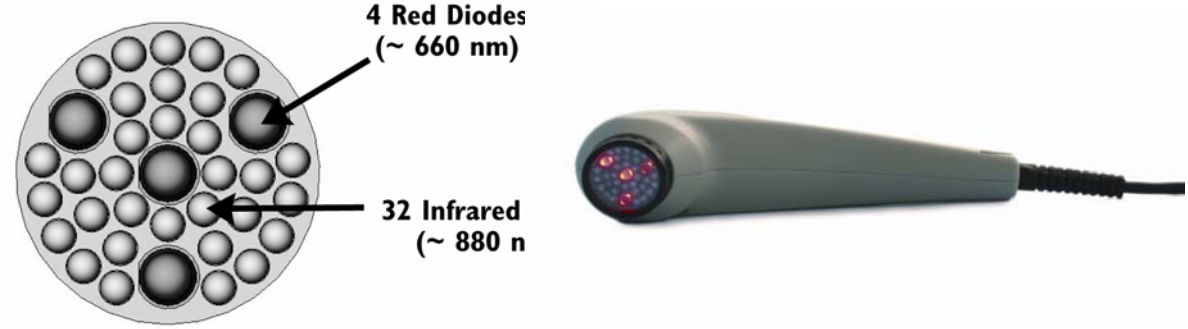
- Continuous Wave (CW) = Light is continuously on, not pulsed
- Watts (W) = Energy (1 Joule) per second
- Milliwatt (mW) = One thousandth of a watt. Power determines length of treatment.
- Nanometer (nm) = One billionth of a meter. Wavelength determines depth of penetration.
- Joule(s) = Watts X seconds = total energy delivered
- Dose (per cm^2) = (J/cm^2) - Total energy delivered per square cm in a set period of time.

Solaris Light Therapy Probes & Dynatron Xp Pad Specifications

Following are the General Specifications for each of the Solaris probes, Xp Pad and Booster Box. Other ranges, accuracy and precision values that are not provided here may be obtained from Dynatronics upon request.

Solaris D880 Infrared Cluster Probe

The Dynatron 880 Infrared Cluster Probe is designed with 32 infrared Super Luminous Diodes (SLDs) emitting a wavelength of 880nm and 4 red diodes emitting a wavelength of 660nm.



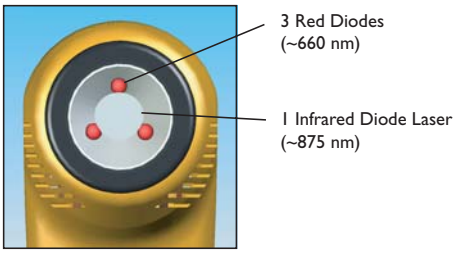
D880 Infrared Cluster Probe Specifications

Light Source:	32 Super Luminous 880 nm Diodes 4 Red 660nm Diodes
Wavelengths:	Infrared Diodes – 880nm Red Diodes – 660nm

Duty Cycles:	CW, 90%, 50%, 10%
Power Output:	500mW (+/- 20%)
Dose:	6 J/cm^2 (1 min. treatment)

Solaris D890 Light Therapy Probe

The Solaris D890 Therapy Probe incorporates one laser diode emitting a wavelength of 875 nm and 3 red diodes emitting a wavelength of 660nm.



Note: Probe head above shown without opaque lens covering.

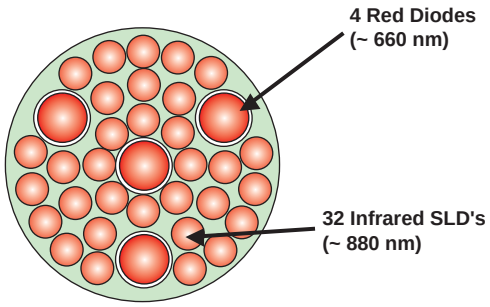
D890 Probe Specifications

Laser Source:	1 Watt Laser Diode
Red Light Source:	3 Red 660 nm Diodes
Wavelengths:	Infrared Laser Diode – 875nm Red Diodes – 660nm
Duty Cycles:	CW
Power Output:	625mW (+/- 20%)
Dose:	6 J/cm^2 (48 sec.)

Imbedded Laser:	1 W 875nm CW un-collimated

Solaris D880 Plus Light Therapy Probe

The Solaris D880 Plus Infrared Cluster Probe is similar to the D880 probe with 32 infrared super luminous diodes emitting a wavelength of 880nm and 4 red diodes emitting a wavelength of 660nm. The difference lies in the power with which the light is delivered. The D880 plus probe has a maximum power output of 1000 mW compared to the maximum output power of the D880 probe of 500 mW, thus reducing total treatment time.



D880 Plus Probe Specifications

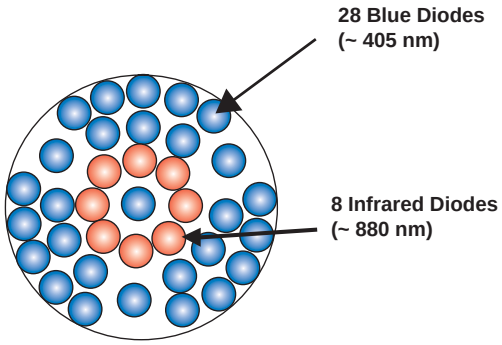
The diodes for the D880 Plus will be arranged exactly as the current D880 diodes. The D880 Plus specification will be as follows:

Infrared Diodes	32 Infrared Diodes
Red Source:	4 Red Diodes
Wavelengths:	Infrared Diode – 800nm Red Diodes – 660nm
Duty Cycles:	CW – 90%, 50%, 10%
Power Output:	1W (1,000 mW) (+/- 30%)
Dose:	6 J/cm^2 (30 sec. treatment)

Solaris D405 Infrared/Blue Light Probe

WARNING: Exposure to Blue Light poses an optical risk. Protective eyewear is therefore required when using the D405 probe.

The D405 Blue/Infrared Light Probe is a combination of Blue Light and Infrared Light designed with 28 Blue diodes emitting a wavelength of 405nm and 8 Infrared diodes emitting a wavelength of 880 nm.

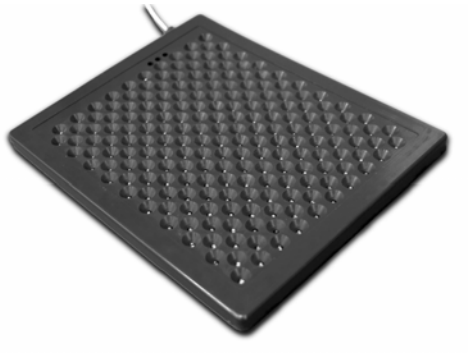


D405 Probe Specifications

Blue Light Source:	28 Blue Diodes
Infrared Light Source:	8 Infrared Diodes
Wavelengths:	Blue Diode – 405nm Infrared Diode – 880nm
Duty Cycle:	CW
Power Output:	500mW (+/- 30%)
Dose:	6 J/cm^2 (1 min. treatment)

Dynatron Xp Infrared Light Pad (*Patent Pending)*

This innovative light pad consists of 200 infrared diodes generating 7500mW of power. The large 8"X10" flexible design of the pad makes it possible to treat any part of the body.



Dynatron Xp Pad Specifications

Light Source:	200 Infrared Diodes
Wavelengths:	Infrared Diode – 880nm
Duty Cycle:	CW
Power Density:	15mW/cm^2
Power Output:	7500mW (+/- 30%)
Dose:	8 J/cm^2 (9.01 min. treatment)

Dynatron Booster Box (*Patent Pending)*

The Dynatron Booster Box is used in conjunction with all Solaris 700 Series devises to provide the power necessary to operate the Dynatron Xp Light Pad.

Solaris Booster Box Specifications

Power Requirements:	100-240 V~, 50/60 Hz
Output current:	2 amps (+/- 10%)
Power Consumption:	1.6 amps maximum
Fuse:	250 V, T1.6 AL slow blow
Dimensions:	14.32" W (36.37 cm) x 2.38" H (6 cm) x 12.7" D (32.26 cm)
Weight:	5.05 pounds (2.3 Kg)

Infrared Light Therapy Probe Overlays

Dynatron Solaris Probes can be identified by either the part number located on the serial number label, or by the color of the overlay on the probe handle. Following are the identifying part numbers and overlay colors associated with each probe.

- D880 Black
- D890 Green
- D405 Blue
- D880+ Black & Gray

Infrared Light Therapy Probe/Pad Default Settings

The following default settings are set by the manufacturer and are selected when you choose a LIGHT THERAPY PROBE or PAD treatment. You may change these defaults to your own preferred settings. See "Setting Defaults" in this manual.

D880
- Dosage: 6 J/cm^2 (1 min. treatment)
- Duty Cycle: CW (Continuous)

D890
- Dosage: 6 J/cm^2 (48 sec. treatment)
- Duty Cycle: CW (Continuous)

D880 Plus
- Dosage: 6 J/cm^2 (30 sec. treatment)
- Duty Cycle: CW (Continuous)

D405
- Dosage: 6 J/cm^2 (1 min. treatment)
- Duty Cycle: CW (Continuous)

Dynatron Xp Pad
- Dosage: 8 J/cm^2 (9.01 min. treatment)
- Duty Cycle: CW (Continuous)

Ultrasound Instructions

The following Ultrasound Instructions are for Solaris 701, 708 and 709 USERS ONLY. The Dynatron Solaris 705 and 706 do not offer the Ultrasound feature.

Ultrasound therapy channels sound waves through muscle, nerve, bone, and connective tissue to aid in reducing pain, muscle spasms, and joint contractures.

The physiological effect of Ultrasound therapy depends upon the frequency of the Ultrasound signal. The lower frequency (1 MHz) penetrates deeper than a higher frequency (such as 2 MHz or 3 MHz), thus the practitioner can decide which frequency to use according to the condition and depth to be treated.

A section in this manual entitled **"Ultrasound Usage Cautions**" provides some general guidelines for Ultrasound treatment and selection of the appropriate soundhead to help ensure you deliver safe and effective treatments to your patients. Further information about Ultrasound application may be obtained from published medical literature.

CAUTION

The Ultrasound Probe Holder was not designed to be used as a handle, to lift or carry the machine.

WARNING

- **ALWAYS keep the applicator soundhead in constant motion.**
- **ALWAYS keep the soundhead properly coupled to the patient's skin or submerged underwater when intensity is turned on.**
- **Use ample conductive gel to ensure good coupling throughout the treatment. If needed, apply additional gel during the treatment.**
- **See the section of this manual entitled "Contraindications, Warnings, and Precautions" for Ultrasound treatments.**
- **Be alert for any sign of periosteal (bone) pain.**
- **Be sure to read all instructions for operation before treating a patient.**
- **Do not drop the soundhead on hard surfaces. Do not cool the soundhead with ice water or ice packs. Do not allow the soundhead to overheat repeatedly. Do not hold the soundhead in the air while a treatment is running. All of these conditions are likely to damage the soundhead crystal and/or to stress electronic components in the device. Damage caused by these conditions is not covered by warranty.**
- **CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous exposure to ultrasonic energy.**

Make sure a soundhead is firmly plugged into the device before turning the device on. When changing to a different size soundhead, turn the machine off first, remove the soundhead, plug in the desired soundhead, then turn the machine on again. **Please acquaint yourself with the following terms and device features prior to delivering an ultrasound treatment.**

Soundhead Warming

When the device is powered on, it automatically enters a default head warming mode. During this mode the soundhead should remain in its holder as a small amount of Ultrasound output is emitted from the soundhead (0.1 Wcm^2). The warming feature turns on and off automatically as needed to maintain a comfortable soundhead temperature. The soundhead warming mode is automatically stopped during a treatment, and resumes automatically as needed after a treatment has ended.

Turn Soundhead Warming Off / On

If you do not wish to use the head warming feature, you can turn the feature OFF. The head warming setting you change to is saved and will apply to the device whenever it is used until you change the setting again. These key presses are only necessary if you want to change the current state of head warming.

- Press and hold the FUNCTION key and the SOUND key simultaneously to turn soundhead warming OFF or to turn it ON again. The device will beep and the TIME display will show the selection made as follows:

  HD 1 = Head warming ON
  HD 0 = Head warming OFF

- Press STOP after selecting the desired setting.

Coupling

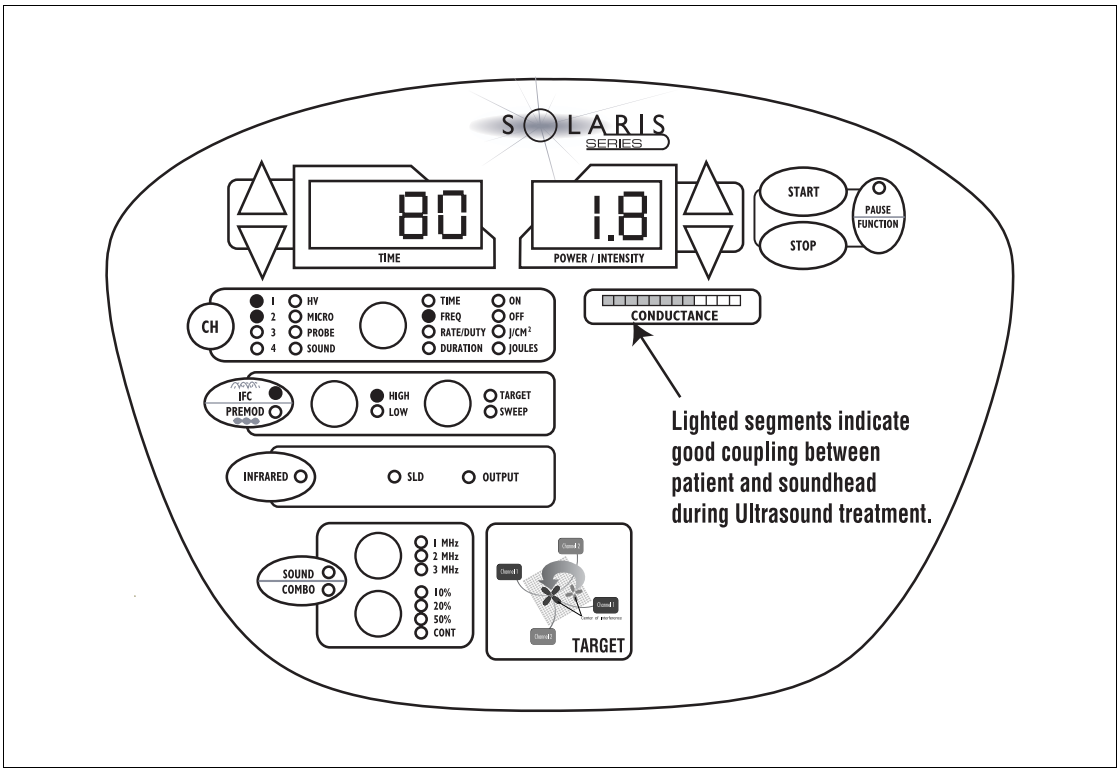
The term “coupling” refers to the ability to deliver ultrasonic waves from the soundhead to the skin surface with as little impedance or dissipation of power as possible. Coupling (contact between the soundhead and the treatment site) may be provided either via a coupling agent such as a gel or lotion. Any material used as a coupling agent must be highly conductive of ultrasonic waves. Air is a very poor conductor of ultrasonic waves. If any part of the soundhead is exposed to air during the treatment, coupling is decreased. The air bubbles in a whirlpool, for example, can decrease the effective Ultrasound therapy to the patient. Therefore, avoid allowing any air between the soundhead and the treatment area, as with underwater treatments. Water is an excellent conductor of ultrasonic waves. Therefore, Ultrasound treatment in water provides excellent coupling.

During the treatment the soundhead should be moved continuously covering an area approximately twice the size of the soundhead. The full surface of the soundhead should maintain contact with the patient’s skin (except with underwater treatments). Do not hold the soundhead in the air while a treatment is running as this may damage the soundhead crystal and/or stress electronic components in the device.

Patient Coupling Display

Patient Coupling is an optional display. It may be turned ON by holding down the SOUND key and pressing the TARGET key during an Ultrasound treatment setup. As Patient Coupling is an optional display, it must be activated with each Ultrasound treatment, or whenever use of the display is desired.

The patient coupling display senses the coupling between the soundhead and the patient to ensure proper delivery of the Ultrasonic therapy. The CONDUCTANCE graph illustrated below provides a graphical representation of patient coupling during a treatment. NOTE: Poor coupling will cause the temperature of the soundhead to increase.



Coupling Bar Graph

Ultrasound Coupling Bar Graph

When the Patient Coupling display feature is operational, it will indicate whether adequate contact is being maintained between the soundhead and the patient's skin using the COUPLING BAR GRAPH. The COUPLING BAR GRAPH is located directly under the POWER/INTENSITY display. The bar graph displays twelve segments with twelve lighted GREEN segments indicating best conductance, and one lighted segment indicating poorest conductance. As conductance decreases, the number of GREEN lighted segments also decreases. If the lighted segments continue to drop, pause the treatment and correct the coupling error.

To correct poor coupling ensure that you are using an adequate amount of Ultrasound conductive gel, and the face of the soundhead is making full contact with the patient's skin.

Note: In the illustration on the previous page, eight of the twelve segments are lighted indicating good coupling.

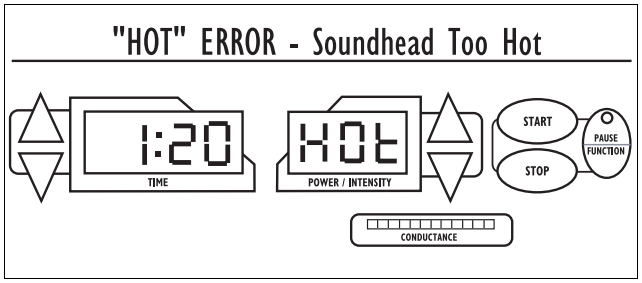
Head Temperature Hot Display

Ultrasound Head Temperature is another optional display that may be used when treating with Ultrasound. To activate this feature, hold down the SOUND key then press the HIGH/LOW key located next to IFC/PREMOD. As Head Temperature is an optional display, it must be activated with each Ultrasound treatment, or whenever use of the display is desired.

If coupling (the effective degree to which the Ultrasound energy is delivered from the soundhead to the patient's body) is not adequate during treatment, the temperature of the soundhead rises and the patient does not receive the full intended dosage. The Dynatron

Solaris CONDUCTANCE graph displays conductance to ensure that the patient is receiving the optimal treatment and that the soundhead crystal is protected from overheating.

- When the coupling is acceptable, all segment lights on the coupling graph are GREEN.
- If the soundhead approaches a temperature of 103 degrees Fahrenheit, the GREEN segments begin to be replaced by CLEAR segments, and the POWER display begins to flash to notify the user to improve the coupling or reduce the power to prevent the soundhead from becoming too hot.
- **If the soundhead temperature approaches the maximum level of 108 degrees Fahrenheit, the POWER/INTENSITY display reads HOT and the treatment is automatically PAUSED.** With the output power stopped, the treatment time stops counting down, and both the TIME and POWER displays flash continuously.



"HOT" Error: During an Ultrasound treatment, if the soundhead becomes too hot, the "HOT" error message is displayed and the treatment is paused to allow the soundhead to be cooled.

NOTE: If the soundhead becomes too hot while you are viewing treatment parameters for another output channel, the device will automatically switch to display of the ULTRASOUND treatment and will display the CONDUCTANCE GRAPH.

The soundhead must then be cooled down before the treatment can resume. When the soundhead cools sufficiently, the power display and the lights on the soundhead will cease flashing. Press PAUSE or START to resume the treatment. The soundhead will cool slowly if placed in the soundhead holder or if held exposed to the air. Larger soundheads take longer to cool than smaller heads. To resume the treatment right away, you can place the soundhead in cool/room temperature water to cool the head more quickly.

NEVER USE ICE OR ICE PACKS TO COOL THE SOUNDHEADS as this is likely to cause thermal shock to the electronic components of the soundhead and may necessitate a costly repair. Heads damaged by thermal shock are not covered by the warranty.

When the temperature is again satisfactory, press the START key to resume the treatment. The output power resumes, the displays return to their normal state, and the timer resumes. While the soundhead is still too HOT, the device will not allow you to resume the treatment.

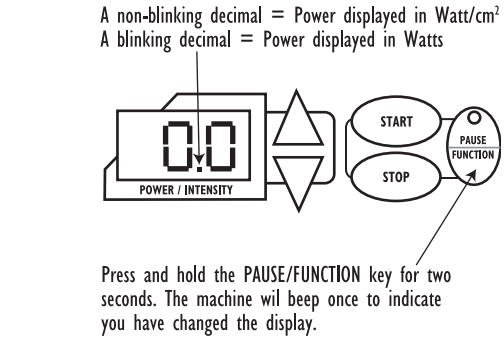
To prevent overheating of the soundhead, maintain good coupling throughout the treatment. For direct coupling, you may need to apply more conductive gel or lotion during the treatment to achieve better coupling.

You can reduce the power during the treatment if you are treating an area where it is difficult to obtain good coupling.

Display Watts or W/cm^2

Power for the Dynatron Solaris may be displayed as WATTS or W/cm^2. The default setting for power is W/cm^2, but you may select the display you prefer at any time before or during a treatment.

- To change the power display, press the PAUSE/FUNCTION key and hold it down for two seconds. To change back, again press and hold the PAUSE/FUNCTION key **for two seconds.**
  The device will beep to indicate you have changed the display. Note that if you are in a treatment when you press and hold the Pause key, the treatment may be paused (the Pause LED is on) and you should press Pause briefly again to turn off the Pause LED and resume the treatment.


A non-blinking decimal = Power displayed in Watt/cm²
A blinking decimal = Power displayed in Watts
START
STOP
PAUSE FUNCTION
POWER / INTENSITY
Press and hold the PAUSE/FUNCTION key for two seconds. The machine wil beep once to indicate you have changed the display.

Dynatron Solaris Power/Intensity Display. You can view power in either W/cm² or WATTS. :

- The default power display is W/cm². If you change the display to WATTS during use, the machine reverts to the W/cm² display when the machine is turned off and on again. However, if you save Ultrasound default settings while using the WATTS display, the WATTS display will become the default display for your machine.

- You can tell when you have selected WATTS display by the decimal in the display window.
  - A steadily-lighted decimal means the power is displayed in W/cm².
  - A blinking decimal means the power is displayed in WATTS.

Basic Ultrasound Setup

Basic Ultrasound Setup

1. Press the **SOUND / COMBO** key once to select SOUND. Press the SOUND key for the D701.
2. Choose the **FREQUENCY** by pressing the SOUND FREQUENCY TOGGLE key.
3. Choose the **DUTY CYCLE** by pressing the SOUND DUTY CYCLE TOGGLE key.
4. Change the treatment **TIME**, if desired using the UP/DOWN ARROW keys.
5. Raise **POWER** to desired level.
6. Press **START**.
7. Press **STOP** if you need to stop a treatment before its time has expired (stops all currently active treatments). Use the TIME arrow keys to bring treatment time to zero or press the FUNCTION and STOP KEY together to stop only the individual displayed treatment.

Detailed Ultrasound Setup

1. Press the **SOUND / COMBO** key once on the D708, D709. Press the SOUND key on the D701.

   When you press the SOUND/COMBO key once on the D708, D709 or the SOUND key on the D701, the SOUND LED is lighted, and the Ultrasound treatment default settings

are automatically selected. If you wish to use the default settings, increase the power to desired treatment level, press START. If you wish to customize settings, follow steps 2-5.

2. Choose the **FREQUENCY**.

   Press the FREQUENCY TOGGLE key one or more times to choose 1, 2, or 3 MHz. Any one of the three frequencies may be selected with the 2 cm^2, 5 cm^2 and the 10 cm^2 soundheads.

3. Choose the **DUTY CYCLE.**

   Press the DUTY CYCLE TOGGLE key one or more times to select the desired duty cycle. Available options include 10 percent, 20 percent, 50 percent, and Continuous duty cycle.

4. Change the treatment **TIME**, if desired by using the TIME UP/DOWN ARROW keys.

5. Raise **POWER**.

   Use the POWER-INTENSITY UP/DOWN ARROW keys to increase the power to the desired setting. For patient safety and comfort, it is recommended that you start with .1 w/cm^2, then increase power to the desired level after the treatment begins. Valid ranges are from 0.1 to 2.0 w/cm^2 (exceptions: valid ranges when using a 10 cm^2 head at 3 MHz are from 0.1 to 1.0 w/cm^2).

   NOTE: You may view the power display in either WATTS or W/cm^2. The default setting for the device is W/cm^2. This option is explained in detail later in this section.

6. Press **START**.

   When you press START the treatment timer begins counting down and output is delivered to the soundhead. If you fail to set the power before pressing START, the intensity display will begin flashing, and you will be unable to start the treatment until you set the power.

   Be sure to use a coupling agent such as gel or lotion, and maintain good coupling throughout the treatment (see "Ultrasound Usage Cautions" in this manual). Do not hold the soundhead in the air, as this will cause the soundhead to overheat. The device provides coupling sensing to help you know when coupling is not adequate. This feature is discussed later in this section.

   SAVE DEFAULTS. If the treatment you have just set up is the most common Ultrasound setup you use, you can save the treatment parameters as new defaults for your own machine. After setting up the treatment, simply press and hold the START key for two seconds. At the end of two seconds, you will hear a beep indicating the treatment parameters have been saved. The next time you select the SOUND modality, these parameters are selected automatically.

7. **MODIFY** a treatment in progress, if desired.

   While the treatment is in progress, you can modify the following treatment parameters.

   - Use the FREQUENCY TOGGLE key to select a different **FREQUENCY**.
   - Use the DUTY CYCLE TOGGLE key to select a different **DUTY CYCLE**,
   - Use the TIME ARROW keys to increase or decrease the treatment **TIME.**

- Use the POWER/INTENSITY ARROW keys to increase or decrease the **INTENSITY**.
- Press and hold the PAUSE/FUNCTION key for two seconds to change display from **w/cm^2 to Watts** or reverse.

8. Temporarily **PAUSE** a treatment, if necessary, while the treatment is in progress.

   To temporarily PAUSE the treatment, press the **PAUSE** key. This stops the Ultrasound output from the soundhead and pauses the treatment timer without ending the treatment. While a treatment is paused, the light on the PAUSE key is lighted and the Ultrasound output to the soundhead is stopped. To resume the treatment, either press START or press PAUSE again. Output then resumes and the treatment timer starts from where it was paused.

   NOTE: During a COMBO treatment, THE STIM OUTPUT OF THE TREATMENT IS NOT PAUSED when the PAUSE key is pressed, although the Ultrasound output is stopped and the treatment timer is paused.

9. Press **STOP** if you need to stop a treatment before its time has expired.
   When the treatment time for a treatment has elapsed, the output to the soundhead is stopped and a tone sounds notifying you of the treatment end.

   ALL STOP: Pressing the STOP key will terminate all treatments in progress.

   STOP ONE TREATMENT ONLY: If you have more than one treatment in progress, you can stop one treatment by either of the following methods. First, press the CHANNEL TOGGLE key to select the channel to be stopped (that channel's light is GREEN when selected).

   FUNCTION-STOP. Press and hold the FUNCTION key and press STOP to terminate the displayed treatment.

   REDUCE THE TREATMENT TIME TO ZERO. Press the TIME DOWN ARROW until the TIME display reaches zero. The device beeps when the time reaches zero and the displayed treatment terminates.

   The output at the selected channel is stopped, and the device then displays the parameters for the next treatment that remains in progress (if any).

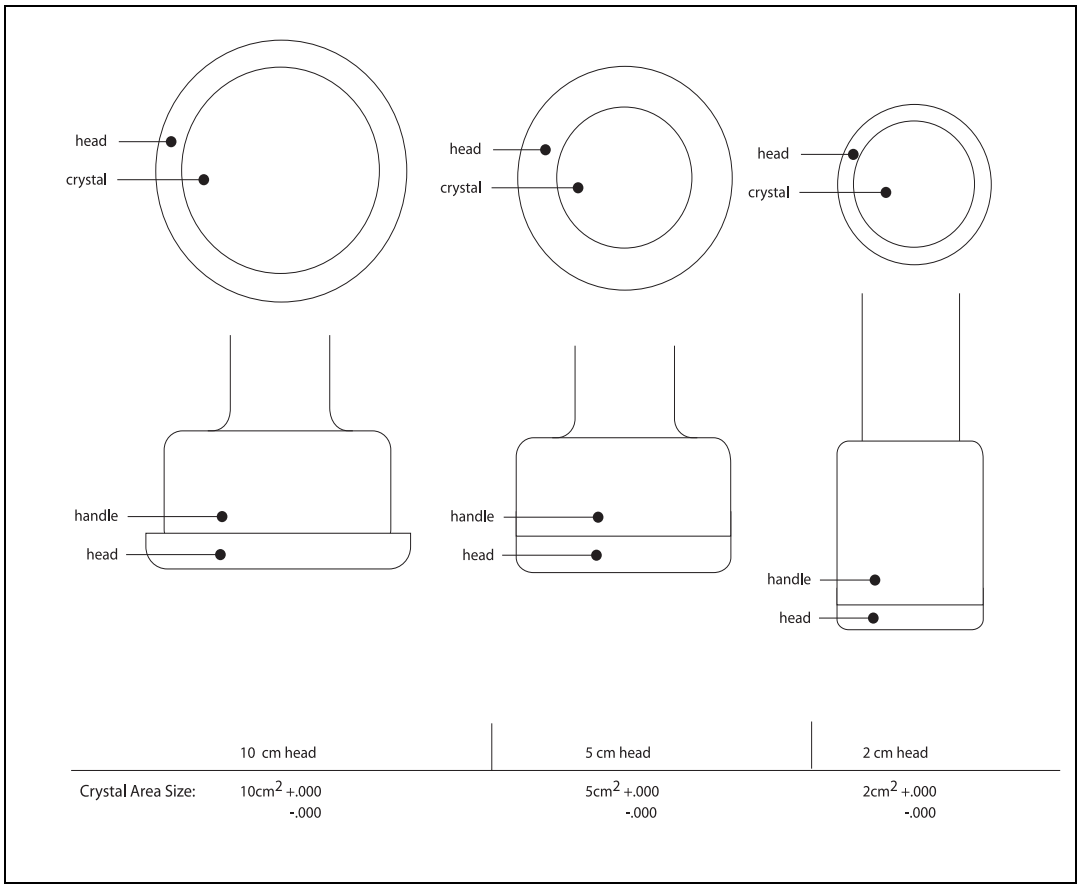
Ultrasound Modality Information

For Dynatron® Solaris™ 701, 708 and 709 users only.
The Dynatron® Solaris™ 705 and 706 do not offer the Ultrasound feature.

Ultrasound, by its very nature, has the ability to irritate the patient's skin. While the benefits of Ultrasound far outweigh any disadvantages, certain precautions should be observed to assure maximum safety and comfort for your patients.

A patient's tendency to have adverse reactions to Ultrasound is dependent upon several factors. Some of these factors are discussed below.

Selecting the Appropriate Soundhead



Head and Crystal Size Comparison

The selection of the appropriate soundhead is key to the success of the treatment and is based on the size of the area to be treated. Ultrasound treatments should be kept specific to the tissue involved in pathology. A good guideline is 2 to 4 times the size of the soundhead. For example:

- A 2 cm^2 soundhead can deliver up to 4 Watts and is appropriate for small areas (i.e. hands, fingers, feet).

- A 5 cm^2 soundhead can deliver up to 10 Watts and is appropriate for medium sized areas (i.e. extremities such as arms, legs and cervical areas).
- A 10 cm^2 soundhead can deliver up to 20 Watts and is appropriate for large areas (i.e. torso and back).

Ultrasound is a directed beam of energy. Therefore, not only will the average spatial intensity be a factor in the dosage the patient receives, but the time delivered and area covered will matter as well. For example, an area of 50 cm^2 is treated for 5 minutes. Then an area of 200 cm^2 is treated for 5 minutes. Both receive the same intensity. The 200 cm^2 area however does not receive the same dosage (only ¼) because as the soundhead is moved around the area it has to cover represents 4 times as much tissue.

The Soundhead area measurement is the ERA (effective radiating area). Each soundhead has an effective radiating area. It is not necessarily the outside diameter of the soundhead, but the area of the crystal inside, therefore special care should be taken in selecting the correct size soundhead for the area to be treated according to the diameter of the crystal. See the Head and Crystal Size Comparison graphic on the previous page.

NOTE: If a patient experiences pain during a treatment, the size of the soundhead may be inappropriate for the area being treated, the intensity is too high or the treatment time is too long.

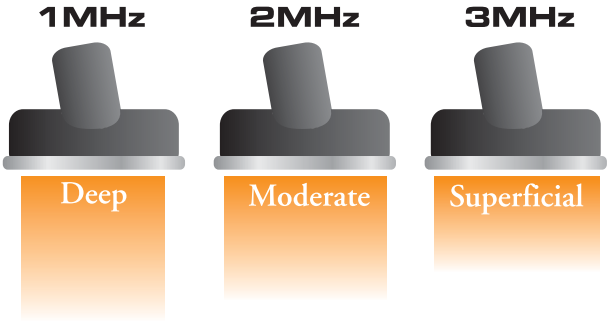
Penetration of Ultrasound Waves

The correct frequency should be selected for the depth of penetration desired. The amount of penetration needed is determined by the density of tissue and the depth of the site to be treated. Care should be taken to select a penetration level that does not cause periosteal (bone) pain.

The frequency determines the depth of penetration of the Ultrasonic wave.

- Select 1 MHz for deep lesions; provides a Half-Value Distance (HVD) of about 5cm.
- Select 2 MHz for moderate depth lesions; about 2.6cm HVD.
- Select 3 MHz for superficial lesions; about 1.5cm HVD.

HVD is the approximate point at which the Ultrasound energy is reduced to half in the average human tissue.



Multi-Frequency Ultrasound

Types of Delivery

Ultrasound can be delivered in four different ways. You will likely only see two of the four methods in clinical practice.

1. Direct Contact Movable: Here the soundhead is placed in direct contact with the patient. A coupling agent is used between soundhead and the patient's skin. The soundhead is moved slowly, but continuously. This is the method of choice.

The rate of speed at which the applicator moves across the skin is very important in determining how much Ultrasonic output is delivered. If the rate is too slow, the patient may feel periosteal pain (bone ache/pain). If the rate is too fast, or if the applicator head becomes uncoupled with the skin, the amount of treatment is reduced. Uncoupling can also cause the soundhead to overheat.

2. Immersion Method: Here the area to be treated is placed underwater. The soundhead is water tight so it can be immersed with the area to be treated. The water becomes the coupling agent. The head is always moving around the surface area, but not in contact (1/2 to 1 inch away).
3. Hydrogel Disk: For treating crater wounds, cover the wound with a hydrogel disk and apply the soundhead to the disk. This allows direct wound sonation without bringing the soundhead in direct contact with the wound.
4. Stationary Soundhead: This method is dangerous. Hot spots can develop. Do not use.

Treatment Time

For Sub-Acute Conditions: $\frac{\text{area to be treated (cm}^2\text{)}}{1.5 \times \text{ERA}}$ = minutes of treatment

For Chronic Conditions: $\frac{\text{area to be treated (cm}^2\text{)}}{1.0 \times \text{ERA}}$ = minutes of treatment

For Maximal Thermal Effect: $\frac{\text{area to be treated (cm}^2\text{)}}{0.8 \times \text{ERA}}$ = minutes of treatment

Treatment Intensity

Several factors come into play as one decides the level of intensity for the treatment.

1. Superficial lesions require less intensity.
2. Less intensity should be used if bone is superficial to the treatment field.
3. Less intensity should be used when the stage of the injury makes heating questionable.
4. Use a little lower intensity for the first treatment to gauge response.
5. Patient feedback is key. A treatment should feel warm, but the patient should never feel heat, pain, stabbing, pricking or dull ache.

Acute Conditions:	0.1 – 0.5 W/cm^2 (no appreciable thermal effect).
Sub-Acute Conditions:	0.5 – 1.0 W/cm^2 (Mild to Moderate thermal effect).
Chronic Conditions:	1.0 – 2.0 W/cm^2 (Moderate to Strong thermal effect).

NOTE: It is very common that intensity is always 1.5 W/cm^2. This is incorrect in many cases. A more specific intensity should be used based on patient response and stage of injury.

Frequency of Treatment

Treatment can be given daily. It is not uncommon to give Ultrasound twice daily, but this may be excessive. Some guidelines may be helpful.

1. Daily may be the best maximum frequency.
2. Ultrasound can be effectively given every other day.
3. Ultrasound should give some positive benefits by the 3rd or 4th application. If not, discontinue the treatment and consider other options.

4. A maximum of 12 to 15 Ultrasound treatments should be given. If the result desired has not been reached by this point, Ultrasound may not be the proper choice.

   EXCEPTION: Some Chronic conditions which cause adhesions.

Usage Cautions – Combination Treatments

When using a Stim device in conjunction with a Solaris Device to output Stim through the soundhead, observe all contraindication, warnings, precautions and usage cautions provided by the manufacturer for all modalities involved.

Potential for Burns or Periosteal Pain

Some patients' skin is more sensitive to Ultrasound output. This can cause a reaction similar to a heat rash. It is also possible for a patient to suffer a burn from Ultrasound therapy if the therapy is not administered properly. This can occur for the following reasons:

- Intensity (power) too high
- Frequency too low
- Holding the soundhead in one place on the patient's skin
- Moving the soundhead too slowly
- Treating an area where sensory nerve damage is present with a loss of normal skin sensation
- Time (Caution: Don't treat too long).

Bony prominences are especially susceptible, as they reflect sound waves and increase intensity to the periosteum resulting in a burning sensation. Desensitized areas can be overheated or burned without the patient realizing it, so extreme care must be taken with these patients (e.g. diabetes, neural damage, etc.)

Burns can be avoided as long as the treatment causes no pain, tingling, excess heat or aching (for patients with normal skin sensation). Use sufficient coupling agent and make sure there are no bubbles in the gel. When treating in water, clear the bubbles off the soundhead and off the patient's skin.

An un-calibrated unit can also cause tingling, excess heat, aching, or a burning sensation.

Read Ultrasound Contraindication, Warning, & Precaution in this manual for more information.

Soundhead Optimization (D701, D708, D709)
Adding or Replacing Soundheads

To ensure soundhead output is optimized, please carefully follow the instructions provided. The procedure utilizes keys and displays on the key pad that are normally used for other purposes, but which have specialized applications in the Head Parameters Mode. If you have any questions about the following instructions, contact Dynatronics' Customer Service Department before proceeding (800) 874-6251).

1. **Head Calibration Printout.** Soundhead models are shipped with a Head Calibration Printout sheet. On the following page is an example of this sheet. The sheet contains unique calibration numbers for a specific soundhead. The soundhead serial number appears on the sheet to assist you in matching the correct soundhead with the printed parameters.

Dynatronics Soundhead Parameters

Serial # Manufacture 9/1/2004
Size (cm) 5 Date
Cal Date 9/28/04
Unit # Solaris
IHT

	1MHz	2 MHz	3 MHz
FREQ	1868	4248	6187
IMPED	897	1295	1253
TEMP	138	184	224
LOAD	888	866	1028

EXAMPLE / DO NOT USE

NOTE: THE ABOVE NUMBERS ARE PROVIDED FOR ILLUSTRATION ONLY AND SHOULD NOT BE ENTERED INTO YOUR DYNATRON DEVICE. USE ONLY THE ACTUAL NUMBERS PROVIDED WITH YOUR OWN SOUNDHEAD.

2. **Plug in Soundhead**. Turn the Solaris Device OFF, then plug in the new soundhead.

3. **Enter Head Parameters Mode**. To enter the Head Parameters Mode, press and hold the **Ultrasound Duty Cycle toggle key** (10%, 20%, 50%, Cont key) while turning the machine ON. Continue holding down the Duty Cycle toggle key until the device finishes its startup sequence.

   The unit senses and displays the head size in the Power-Intensity display. For example, if "5" is displayed, it means the device senses a 5 cm^2 head is plugged in.

4. **Enter 1 MHz Values**. You will begin by entering the 1 MHz values from the Head Calibration Printout. Make sure that the 1 MHz LED is lighted before entering these values.

   Locate the 1 MHz column on the printout. You will enter the values shown for F1, Z, and TEMP. Enter those numbers as follows:

   a. Select CONT Duty Cycle: The CONT and 1 MHz LEDs are lighted. Enter the value for **F1 – 1 MHz** by pressing the time selection keys until the desired value is displayed in the Time display.

      Use the Time Selection (up/down) keys to enter the desired number. The value you enter is displayed in the TIME display. Press and hold the up or down key to move more quickly to the desired number, or press and release the key to step up or down one digit at a time.

   b. Select 50% Duty Cycle: With the 50% LED lighted, enter the value for **Z – 1 MHz**.

   c. Select 20% Duty Cycle: With the 20% LED lighted, enter the value for **Temp – 1 MHz**.

   d. Select 10% Duty Cycle: With the 10% LED lighted, enter "0" (zero) as the value for **Coupling**. The coupling detection feature is not available with old-style soundheads.

5. **Enter 2 MHz Values**. Press the FREQ key to select 2 MHz. Make sure the 2 MHz LED is lighted. Locate the 2 MHz column on the printout, and enter those numbers as follows:
    a. Select CONT Duty Cycle: The CONT and 3 MHz LEDs are lighted. Enter the value for **F1 – 2 MHz** by pressing the time selection keys until the desired value is displayed in the Time display.
    b. Select 50% Duty Cycle: With the 50% LED lighted, enter the value for **Z – 2 MHz**.
    c. Select 20% Duty Cycle: With the 20% LED lighted, enter the value for **Temp – 2 MHz**.
    d. Select 10% Duty Cycle: With the 10% LED lighted, enter "0" (zero) as the value for **Coupling**. The coupling detection feature is not available with old-style soundheads.

6. **Enter 3 MHz Values**. Press the FREQ key to select 3 MHz. Make sure the 3 MHz LED is lighted. Locate the 3 MHz column on the printout, and enter those numbers as follows:
    a. Select CONT Duty Cycle: The CONT and 3 MHz LEDs are lighted. Enter the value for **F1 – 3 MHz** by pressing the time selection keys until the desired value is displayed in the Time display.
    b. Select 50% Duty Cycle: With the 50% LED lighted, enter the value for **Z – 3 MHz**.
    c. Select 20% Duty Cycle: With the 20% LED lighted, enter the value for **Temp – 3 MHz**.
    d. Select 10% Duty Cycle: With the 10% LED lighted, enter "0" (zero) as the value for **Coupling**. The coupling detection feature is not available with old-style soundheads.

7. **Store New Parameters**. After you have entered all parameters, press START to store them in the device's memory. Then press STOP to exit this mode.

The above procedure must be performed for each separate soundhead for the device. Turn the device OFF before attaching the next soundhead, then turn the device ON again with the soundhead firmly plugged in. For annual calibration maintenance information please see pages 130-131 of this manual.

Ultrasound Calibration Procedures

To maintain the accuracy of all soundheads, they must be calibrated with the device every six months to a year to ensure proper operation. With the exception of calibration, all service on the Dynatron Solaris device should be performed by a Dynatronics service technician. If your Dynatron Solaris requires service, contact Dynatronics Customer Service at (800) 874-6251. **The calibration procedure MUST be performed by a qualified ultrasound technician using the proper equipment.** Calibration may be performed either by Dynatronics or by an ultrasound technician in your local area.

When to Calibrate: Dynatronics recommends that the Dynatron Solaris be calibrated at least annually to ensure the unit is working at its peak performance.

What to Calibrate: You must calibrate **all soundheads used with this device at 1, 2 and 3 MHz frequencies**.

Equipment Required: The process requires an **ultrasound power meter capable of accurately measuring outputs up to 3 MHz**. Check the manufacturer's specifications to confirm your power meter meets this qualification. Ohmic Instrument UPM-DT1 or UPM-DT-10 are recommended for use (refer to the operation manual for these devices for instructions on their use).

You will also need the **"Frequency" numbers** for each soundhead. You may obtain the frequency numbers for each soundhead by calling Dynatronics Customer Service or referring to the Dynatronics **Soundhead Calibration Printout** shipped with each Dynatronics' soundhead.

Water Quality: Water used in the testing procedure must be **degassed water** with an oxygen content of four parts per million (4ppm) or less.

The following steps are provided to assist the technician with the calibration procedure. A calibration program is built into the software for the device. The procedure utilizes keys and displays on the key pad that are normally used for other purposes, but which have specialized applications in the Calibration Mode.

If you have any questions about the following instructions, contact Dynatronics' Customer Service Department before proceeding (800) 874-6251.

STEPS

1. Begin with the machine turned off. Plug the soundhead to be calibrated into the Dynatron Solaris ultrasound output jack and center the soundhead over the cone in the ultrasound power meter.

2. Enter the Dynatron Solaris' Calibration Mode by pressing and holding the **PAUSE** key while turning the machine on. The display windows first show the soundhead type that is plugged into the machine (see Soundhead Types Table). The soundhead type is displayed for about one second. When the soundhead type is displayed, release the PAUSE key.

   Soundhead Types Table
   Time Display:
   $2cm^2$ = H 2
   $5cm^2$ = H 5
   $10cm^2$ = H10

   Soundhead Types

   Note: Holding the PAUSE key too long will display" 00" in the TIME display window.

   Next, the display shows the stored frequency values for the soundhead that is being calibrated. The output power display is set to a value of zero. The LED for 1 MHz should be illuminated indicating the soundhead is now ready to be calibrated for this frequency. If it is not, press the toggle key to **select 1 MHz** now.

3. Press STOP and the TIME UP ARROW simultaneously to enter the Temperature Mode. The temperature of the soundhead is displayed in the Time display window. The soundhead must be at a temperature between 72 and 75 degrees. If the sound-head is not within this range, warm the water and/or the head before continuing. Press **STOP** to get out of the temperature mode. At this point there is zero output from the device. Zero the scale on your ultrasound power meter now. When the scale is at zero on your power meter, **press the START key** to begin.

4. Press the **UP/ DOWN arrow** keys located next to the Power display window on the Dynatron Solaris until the test power meter shows the target value for the specific soundhead size (Consult the table "Target Value - Power Meter" on the following page for target power meter readings.

5. When the watts reading on the test power meter is at target value for the soundhead and the reading is stable, press the **Duty Cycle toggle** key (this is the key that selects 10%, 20%, 50% or Continuous).
6. The Dynatron Solaris performs the calculation internally for the "Z" (impedance value) and the coupling value. These values are automatically entered and stored in the Head Parameters for the device (this operation is automatic and invisible to the user). Record these values on the calibration sheet for future reference.

Target Value – Test Power Meter

Head Size	Power Meter Value
2cm²	2 watts
5cm²	5 watts
10cm²	10 watts

Target value is 1.0 w/cm² for the soundhead size used.

7. Press the frequency toggle key to **select 2 MHz**. The 2 MHz LED will light indicating the soundhead is now ready to be calibrated at this frequency. Repeat steps 3 through 5 above.
8. Press the frequency toggle key to **select 3 MHz**. The 3 MHz LED will light indicating the soundhead is now ready to be calibrated at this frequency. Repeat steps 3 through 5 above.
9. Press the PAUSE key when calibration is complete. Pressing PAUSE will exit the calibration mode.
10. This completes the calibration of one soundhead. For devices that use more than one soundhead, you must calibrate each of those soundheads individually.

NOTE: When calibration is complete, if "HEAD 3 ERROR" appears in the display window, one or more parameters may not have saved. Begin calibration steps again, paying close attention to the instructions in step 3.

To calibrate the next soundhead, turn the machine off, and repeat steps 1 through 10 above.
CAUTION: Avoid unnecessary ultrasound exposure.

Problem Solving

Soundhead Temperature Too Hot

If poor coupling occurs during a treatment, the temperature of the soundhead rises and the patient does not receive the full ultrasonic output. This device continuously measures the temperature of the soundhead to ensure both that the patient is receiving the optimal treatment and that the soundhead crystal is protected from overheating.

If the soundhead temperature approaches the maximum level, the POWER display will begin flashing.

If the temperature reaches the maximum level allowed, **the treatment is automatically PAUSED,** the output power is stopped, the treatment time stops counting down, and both the TIME and POWER displays flash continuously. The soundhead must then be cooled down before the treatment can resume.

See "Ultrasound Instructions" in this manual for more information regarding warnings for a hot soundhead, and the new SOUNDHEAD CONDUCTANCE BAR GRAPH as well as more complete information for cooling the soundhead before resuming treatment.

Cooling the Soundhead

The temperature alert not only ensures good coupling throughout the treatment, it helps avoid damage to the soundhead crystal. If the soundhead becomes too hot, it must be allowed to cool down before resuming the treatment. The head will cool slowly if allowed to sit at room temperature. To cool the soundhead quickly, you can place it in room temperature water. Sometimes just applying more conductive gel will adequately cool the head. Larger soundheads will take longer to cool down. **DO NOT USE ICE to cool the soundhead as this can cause thermal shock to the crystal and may necessitate a costly repair. Damage caused by thermal shock is not covered under the warranty.**

Whirlpool Treatments

If you are treating in a whirlpool, you may find the temperature reaches a high enough temperature to cause the display to flash (103˚). This is a warning only to let you know you are approaching the temperature limit. You may, however, continue with the treatment at this level. If your whirlpool temperature is hot enough to cause the treatment to stop, you may need to adjust the temperature of the whirlpool.

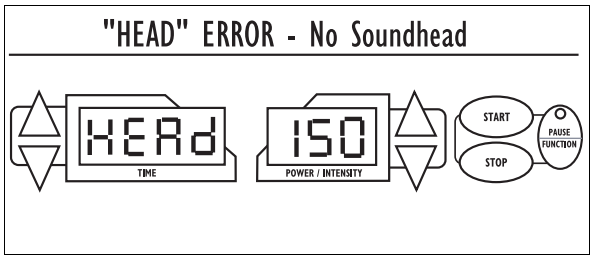
Soundhead Temperature Too Cold

If the soundhead has been sitting in a very cold room or vehicle, it could be too cold to operate when you turn the device on. The keypad may not respond to key presses and you will be unable to use the device until the soundhead is sufficiently warmed. You must raise the temperature of the soundhead to about 60 degrees F. in order for the machine to recognize that the soundhead is present and to proceed with setting up a treatment. You can accomplish this with any of the following methods:

1. Press the flat face of the soundhead against the palm of your hand for 30 to 60 seconds to warm it slightly. This usually provides adequate warmth to the crystal to raise the temperature to the minimum acceptable level. Once the crystal reaches this level, you can proceed with treatment.
2. You can also place the soundhead in room temperature water to warm the crystal. However, **do not** place the soundhead in very hot water when the crystal is this cold as it could damage the crystal.

No Soundhead

If the device cannot detect a soundhead during setup or delivery of an Ultrasound treatment, the error message “HEAD” is displayed in the TIME display. If this error occurs, check to be sure the soundhead is firmly plugged into its connector. If you are unable to clear the message by reconnecting the soundhead, contact Dynatronics’ customer service department at 1-800-874-6251 for assistance.



“HEAD” Error. This error message indicates the soundhead is not plugged in or for some reason is not being detected by the device.

Other Error Messages in the Display

Certain conditions can cause an error in operation. When this occurs, the machine will not allow a treatment to be set up or delivered and will display an error message in the LED displays. An error message can consist of any combination of alpha-numeric characters which are not normally expected at any given point in treatment setup or delivery. Some errors are easily resolved by the following methods.

- Press STOP to stop the treatment (if any), and turn the machine OFF then ON again. Always wait 5-10 seconds before restoring the device.
- Check to be sure the soundhead has not become disconnected from the machine. The soundhead should be firmly plugged into its port. Only Dynatronics soundheads may be used with this device. If the soundhead has been dropped, it may be damaged. If the device operates normally with one soundhead, but not with another, the problem may be a damaged soundhead and you must contact Dynatronics Customer Service.
- Make sure the soundhead is not too hot. In this case the POWER/INTENSITY LED display will flash. Any other display indicates a problem not related to a soundhead that is too hot. For HOT soundheads, follow the instructions provided earlier in this section.
- Check to see if conditions may have caused extreme moisture condensation in the device. This could occur when the machine has become very cold then is brought indoors to a warm, humid environment. Condensation is a not a serious condition. Allow the machine to sit in a dry environment until the condensation dries. The machine will operate normally once the condensation is gone.

ERROR 13: The Error 13 message can occur if you plug in a soundhead while the device is on. If you get this error, make sure the soundhead is firmly plugged in, then turn the device off and on again. Allow 5-10 seconds between turning the device OFF and turning it back ON. The message should be cleared.

If you have tried all of these suggestions, and the error is still displayed on the LEDs, the device may require service by the manufacturer. In this case, make a note of the error message and the sequence of events that cause the error, and contact Dynatronics Customer Service at 1-800-874-6251 for further assistance. **Do not send the device to Dynatronics without first contacting the Customer Service Department**.

Ultrasound Specifications (Dynatron Solaris 701, 708, and 709 only)

Ultrasound Power output:

2cm^2 head:	1 MHz, 2 MHz, 3 MHz	0-4 watts; 0-2.0 w/cm^2 ± 10%
5cm^2 head:	1 MHz, 2 MHz, 3 MHz	0-10 watts; 0-2.0 w/cm^2 ± 10%
10cm^2 head:	1 MHz, 2 MHz	0-20 watts; 0-2.0 w/cm^2 ± 10%
10cm^2 head:	3 MHz	0-10 watts; 0-1.0 w/cm^2 ± 10%

Ultrasound Default Settings

The following default settings are set by the manufacturer and are selected when you press the SOUND/COMBO key. You may change these defaults to your own preferred settings. See “Setting Defaults” in this manual.

- 1 MHz for 2, 5, and 10cm^2 soundheads
- Continuous
- Time: 5 minutes

Ultrasound Regulation and Technical Information

For the Dynatron® Solaris™ 701, 708, and 709 Only

The Dynatron Solaris 701, 708, and 709 comply with the following:

- FDA 21CFR 1050(c)(1)(i). The error in indication of the temporal-average ultrasonic power shall not exceed ±20 percent for all emissions greater than 10 percent of the maximum emission.
- FDA 21CFR 1050(c)(1)(ii). The sum of the errors in the indications of temporal-maximum ultrasonic power and the ratio of the temporal-maximum effective intensity to the temporal-average effective intensity shall not exceed ±20 percent for all emissions greater than 10 percent of the maximum emission.
- R 1050.10(c)(2). The treatment timer must be accurate to within 0.5 minute of the preset duration of emission for settings less than 5 minutes, to within 10 percent of the preset duration of emission for settings of from 5 minutes to 10 minutes, and to within 1 minute of the preset duration of emission for settings greater than 10 minutes.

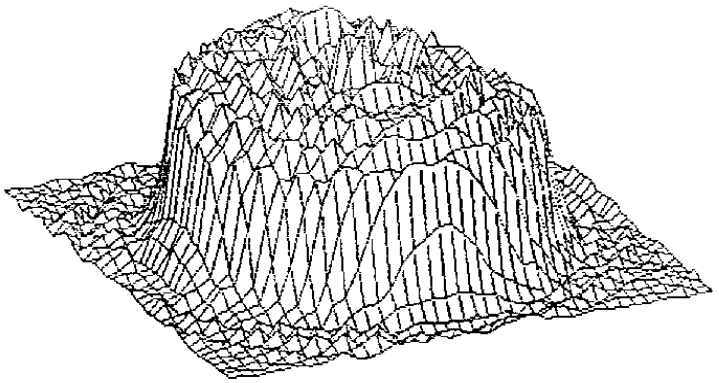
NOTE: The Dynatron Solaris 701, 708 and 709 are accurate to within ±1% of any treatment time.

Pursuant to FDA 21CFR 1050.10(f)(1), the uncertainties in magnitude, expressed in percentage error, of the ultrasonic frequency, effective radiating area, and the ratio of the temporal-maximum to temporal-average effective intensity, pulse duration, and pulse repetition rate for the Dynatron Solaris 701, 708 and 709 are as follows:

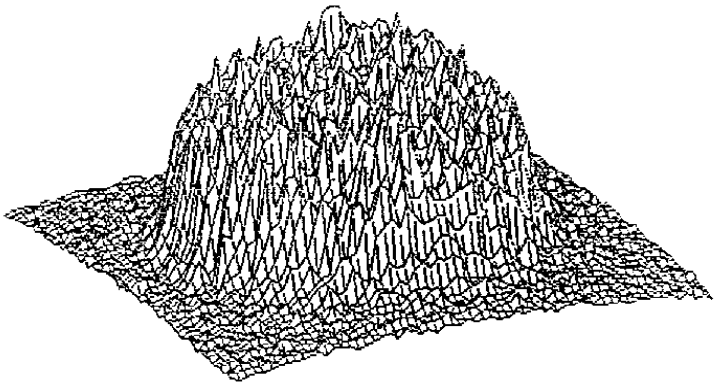
(1) Ultrasonic frequency.....±15%
(2) Effective Radiating Area .....±50%
(3) Ratio of the temporal-maximum to temporal-average effective intensity.....±20%
(4) Pulse duration .....±10%
(5) Pulse repetition rate .....±10%

Beam Profiles

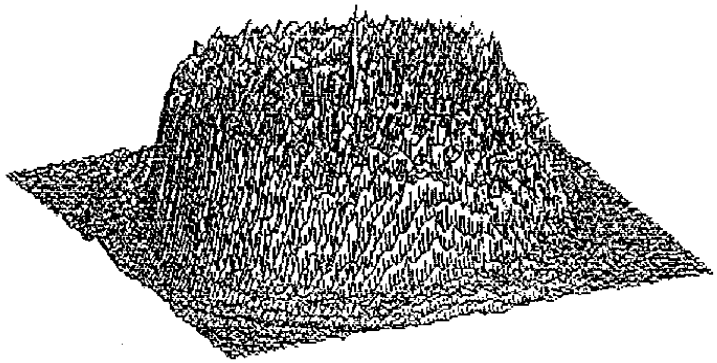
(For Dynatron Solaris 701, 708, and 709 users only. The Dynatron 705 & 706 do not offer Ultrasound.) The following diagrams show the typical spatial distribution of the radiated field for each size of Dynatron Solaris soundhead. This applies to the radiation emitted into the equivalent of an infinite medium of distilled, degassed water at 30˚ C and with line voltage variations in the range of ±10 percent of the rated value.



1 MHz

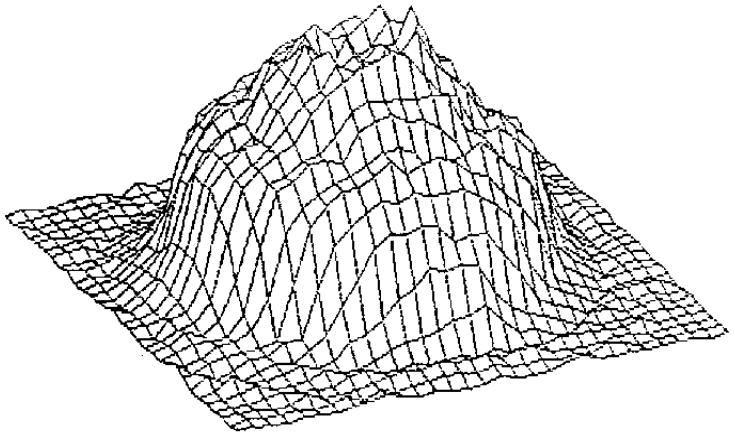


2 MHz

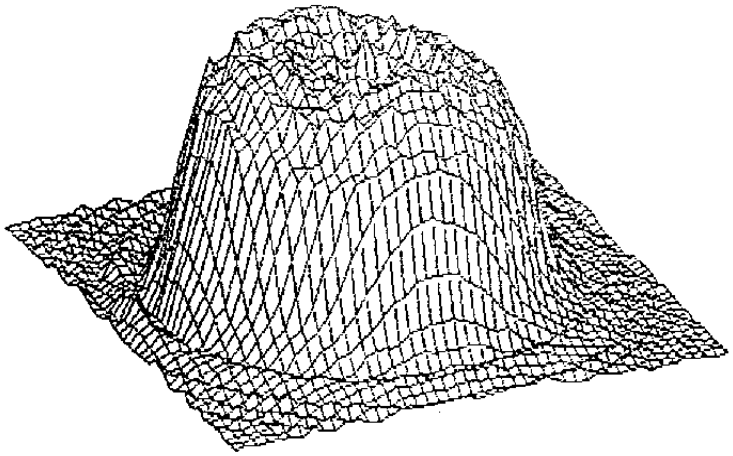


3 MHz

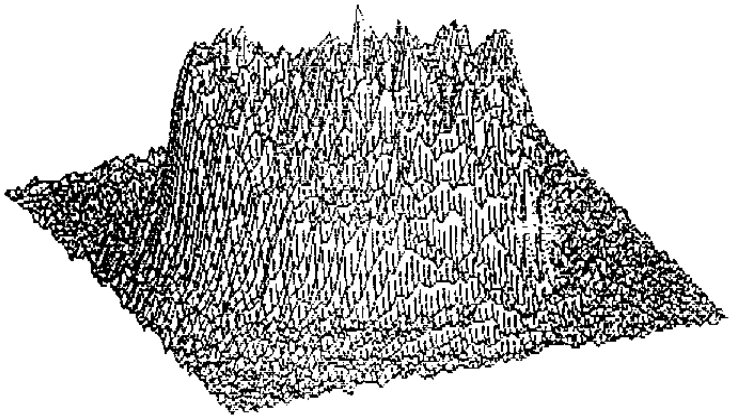
10 cm^2 Head. Near Field



1 MHz

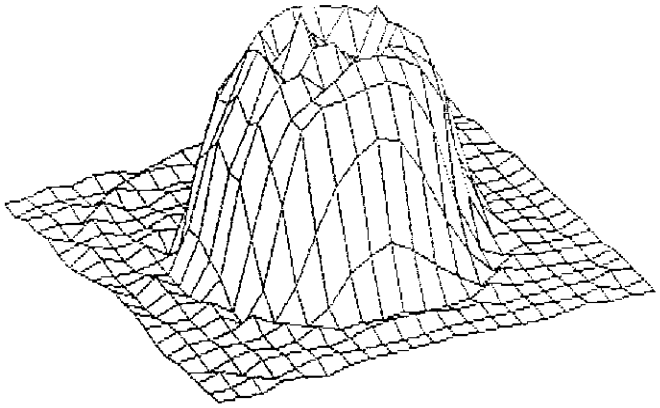


2 MHz

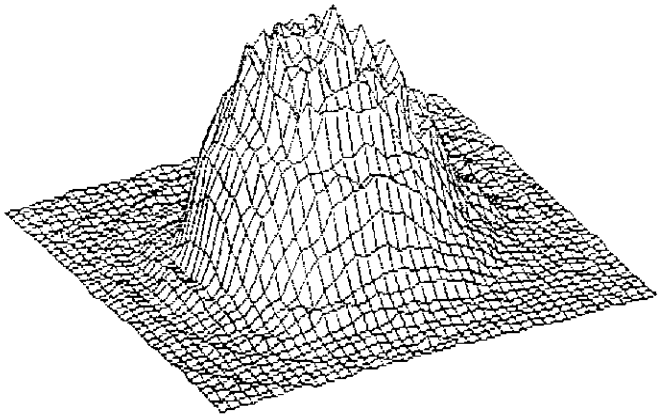


3 MHz

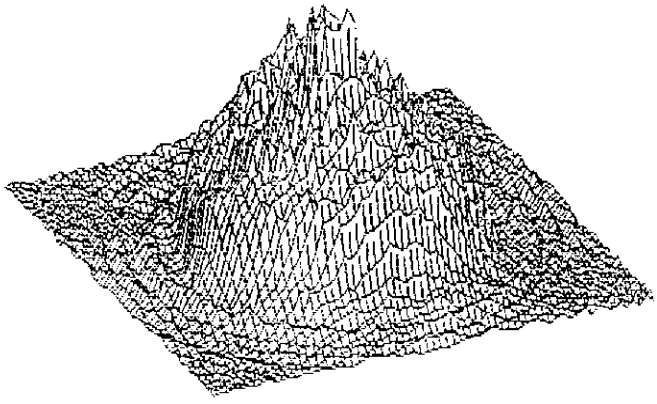
5 cm^2 Head. Near Field



1 MHz



2 MHz



3 MHz

2 cm^2 Head. Near Field

Combination Therapy Instructions

The following combination therapy instructions are for DYNATRON Solaris 701, 708 and 709 USERS ONLY. The Dynatron Solaris 705 and 706 do not offer the Ultrasound feature.

WARNING

- **DO NOT use combination therapy for underwater treatment. Placing active electrodes underwater poses a serious hazard to the patient!**
- **Use VERY LOW STIM INTENSITY for COMBO treatments.**
- **Remember to observe all contraindications, warnings, precautions, and usage cautions for BOTH Ultrasound and Electrical Stimulation therapy when performing combination therapy.**
- **Since electrical current travels between the electrode and the soundhead during COMBO treatment, the electrode should be placed in proximity with the treatment area. Do not place the electrode and soundhead in positions that will cause current to pass through contraindicated areas.**
- **Avoid removing the soundhead from the skin surface during "Stim Through Soundhead" treatments, as this may cause increased current density momentarily which may be uncomfortable to the patient. The soundhead should remain in full contact of the skin until current output is stopped.**
- **Be alert for any sign of periosteal (bone) pain.**

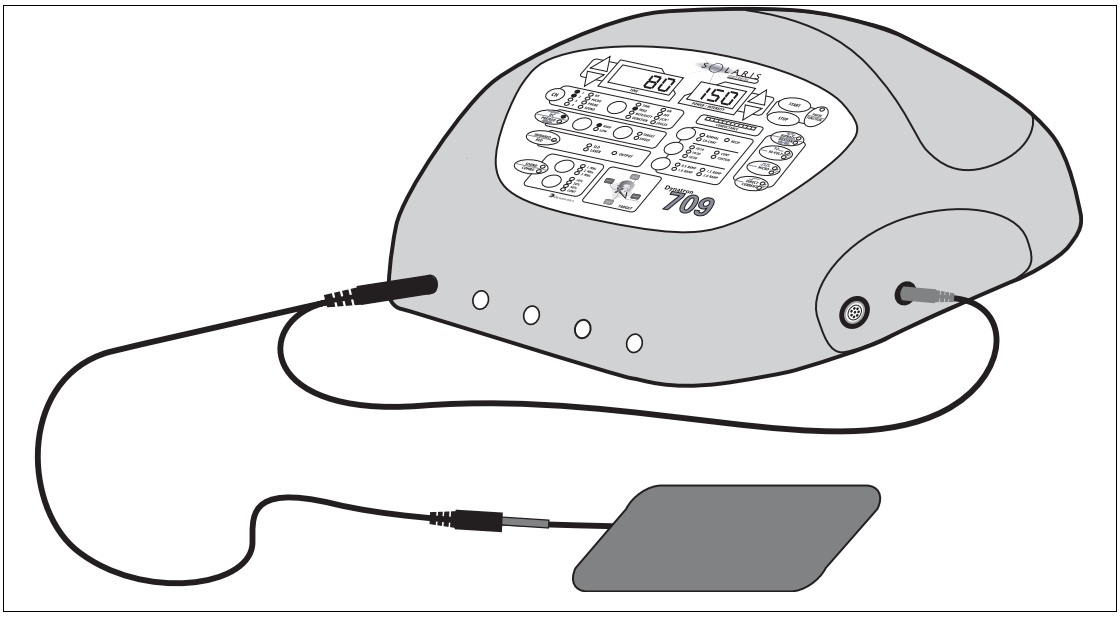
Combo*plus*™

Dynatronics' Combo*plus* feature means you have almost unlimited options in setting up a combination treatment with Solaris. Now you can:

- Combine an Ultrasound treatment **with any unattended single-channel electrotherapy modality** provided by this device. Single-channel options include Premodulated, Biphasic, Russian, High Volt, or Microcurrent.
- Set up a combination treatment by using the ULTRASOUND OUTPUT JACK and the automatically selected default STIM CHANNEL. When using the D708 and D709, the Microcurrent Combo will always use Channel 1, and High Volt Combo treatments will default to the High Volt (HV) channel.
- When setting up a combination treatment using the D701, connect the Dynatron Stim device to the D701 using a pin-to-banana adapter inserted into the COMBO INPUT jack located on the right side of the D701 base unit.

A special "COMBO" lead wire is provided with the D708 and D709 with the standard accessories for this device to accommodate the Combo*plus* feature. This lead wire is plugged into the selected stim jack; then the banana end of the lead is connected to the COMBINATION INPUT JACK on the right side of the device, and the pin end of the lead is connected to an electrode to be placed on the patient. The following illustration shows one

example of a combination therapy setup. It is important to note the channel selected by the device during setup and connect the lead wire to the correct channel before setting intensity for the treatment.



Special COMBO Lead Wire:. Stereo jack attaches to any of the channels. Banana end plugs into the stim input on right-hand side of the device. The pin end of the lead wire attaches to an electrode.

Stim Through the Soundhead

With combination therapy, the soundhead is used in place of one electrode for a stim treatment; and electrotherapy current is delivered through the soundhead. This means that for a normal 2-electrode stim treatment therapy, you would place one electrode on the patient and use the soundhead as the second electrode site to complete the setup. A patient lead wire designed to accommodate this setup is included in the Dynatron Solaris standard accessory package.

During the treatment, the stim current passes between the soundhead and the other electrode. At the same time ultrasonic waves are introduced into patient tissue through the soundhead. Avoid touching the electrode with the soundhead during the treatment, keep the soundhead in contact with the patient's skin at all times, and **keep the intensity low for the stim current**.

When setting up a combination treatment, observe all contraindications, warnings, and precautions for both therapies to be used.

REMEMBER: Use a very low stim intensity for all COMBO treatments!

Combination Therapy Setup

In order to set up a COMBO treatment, you must be familiar with setup instructions for both the electrotherapy modality to be used and Ultrasound as explained earlier in this manual. Also remember:

- When a channel's LED is GREEN, the treatment parameters for that output are displayed. Any changes you make to the parameters will affect that channel only.

- When an indicator light is YELLOW, the channel is active, but its parameters are not being displayed and may not be modified at this time. On the D708 and D709 devices, you must first press the CHANNEL TOGGLE key (CH) to select the channel—its light will then become GREEN and modifications are allowed. On the D701, press the SOUND key to bring the ultrasound modality into focus.

When using the D708 or D709, since Ultrasound and stim share the TIME and POWER/INTENSITY displays during a combination treatment, you will need to observe the indicator lights when setting up or changing treatment parameters. You may toggle between the stim and SOUND channel using the CHANNEL TOGGLE key. The treatment timer does not begin until you press START after both modalities have been set up.

Detailed Combination Therapy Setup

1. Press the SOUND/COMBO key on the D708 and D709 twice to select COMBO. Both the COMBO and the SOUND LED will be illuminated. Press the SOUND key on the D701.

2. With the green SOUND indicator LED illuminated, you may proceed to select parameters for the Ultrasound portion of the COMBO treatment.

3. Enter Ultrasound parameters as described in "Ultrasound Instructions" found in this manual. Although parameters and settings are selected for ultrasound therapy, no ultrasound power will be delivered until you press START after both the SOUND and the STIM modalities have been set up.

4. When using the D701, plug the Dynatron Stim unit into the Combo Input Jack on the base unit of the D701using a pin-to-banana adapter. Setup the Stim treatment by following the instructions that accompany the Stim device being used.

   When using the D708 or D709 toggle to the Stim channel by pressing START or the CHANNEL TOGGLE key. The system defaults to a PREMOD treatment selection unless you have previously chosen another default therapy. When setting up the STIM portion of the treatment the front panel of the device shows the following default selections:

   - The COMBO LED is lit.
   - The default modality (PREMOD) key is lit.
   - The first available channel for the stim therapy chosen is indicated by a GREEN LED. The SOUND channel light is YELLOW.
   - The TIME display shows 5 minutes (or other time if you changed this while setting up the ULTRASOUND portion of the COMBO treatment).

5. If you want to use an electrotherapy modality other than the PREMOD default choice when using the D708 or D709, (i.e., Russian, Biphasic, High Volt, or Microcurrent) press that modality key now. (NOTE: COMBO with MICROCURRENT requires the use of Channel 1. HIGH VOLT must use its dedicated channel). When a modality key is pressed, the LED on that key is lighted while the COMBO LED remains lighted as well.

6. Plug the combo lead wire into the channel jack of the D708 or D709 that corresponds with the channel for the modality chosen. The banana connector end plugs into the stim input jack on the right side of the unit. The pin end attaches to the dispersive electrode. Apply the dispersive electrode to the patient now. Apply conductive gel to the Ultrasound treatment site now.

7. Enter treatment parameters for the selected STIM modality as instructed earlier in this manual.

8. Place the soundhead at the treatment site making good contact with the skin (be sure you have applied conductive gel first). Raise the stim intensity to the desired level. If the soundhead is in proper position and coupling is good, the patient will feel the current. If the patient does not feel the current, check to be sure coupling is good and make sure you have used ample conductive gel.

   KEEP THE STIM INTENSITY LOW!

9. After both modalities are set up, continue to ensure the soundhead is making contact with the patient's skin and press START.

   If you fail to set the INTENSITY or ULTRASOUND POWER before pressing START, the POWER/INTENSITY DISPLAY (D708, D709) or the POWER/DOSE DISPLAY (D701) will begin flashing, and you will be unable to start the treatment until you set the intensity. Remember that you must set both the intensity for the STIM treatment and the power for the SOUND treatment.

10. Press **STOP** if it is necessary to stop a treatment before time has expired.

    When the treatment time has elapsed, the therapy to the patient stops and a tone sounds notifying you of the treatment end. Treatments in progress may be stopped at any time using one of the following methods.

    ALL STOP: Press the STOP key to stop all treatments at all channels on the D708 and D709 devices. The output for the channel(s) selected is stopped (both stim and sound channels), and the device then displays the beginning treatment parameters

    Pressing STOP on the will stop only the ultrasound treatment. STOP must also be pressed on the separate Stim device.

    STOP ONE TREATMENT ONLY (D708 AND D709): If you have more than one treatment in progress, you can stop one treatment by either of the following methods. First, press the channel toggle key to select the channel to be stopped (that channel's light is GREEN when selected).

    FUNCTION-STOP. Press and hold the FUNCTION key and press STOP to terminate the selected treatment.

    REDUCE THE TREATMENT TIME TO ZERO. Press the Time down arrow until the Time display reaches zero. The device beeps when the time reaches zero.

NOTE: Pausing a COMBO Treatment

In COMBO mode, if a treatment is paused by any means (either by pressing the PAUSE key or as a result of a soundhead that has become too hot), the Ultrasound output is stopped and the treatment timer is paused. However, the stim current continues to be delivered. Therefore, the pause condition should be corrected as quickly as possible and the treatment resumed, or the treatment should be stopped completely by pressing the STOP button.

Modify Treatment

- Modifications to a treatment in progress may be made to both modalities used. See the instructions earlier in this manual for specific modification instructions for each modality. Note: Consult the Stim modification instructions for any device being used in conjunction with the D701.
- Keep in mind (when using the D708 or D709) that since the stim and the Ultrasound modalities share the TIME AND POWER/INTENSITY displays, you will need to select the desired output channel with the CHANNEL TOGGLE key before making changes to the Ultrasound or the stim portion of the treatment. Also, treatment time for both treatments is simultaneous. Changing the treatment time affects both therapies.

Combination Default Settings

The factory default for a COMBINATION TREATMENT is an Ultrasound treatment with a Premodulated treatment and the respective default settings for those two modalities.

In COMBO mode you can save new default treatment time and the preferred stim modality. The stim settings in a COMBO treatment are determined by the defaults of that modality. Separate Ultrasound default settings may be saved for the COMBO treatment which will not affect Ultrasound-only treatments.

If you save defaults during a COMBO treatment the following settings are saved:

- The stim modality that is selected for the current COMBO treatment is saved as the default stim treatment for COMBO.
- Stim parameters for this setup are saved and become the default settings for that stim modality whenever it is used including COMBO treatments.
- Ultrasound parameters for this setup are saved, and become the default Ultrasound settings for combination treatments only (non-combination Ultrasound treatments may have different default settings).
- The treatment time is saved as the default treatment time for combination treatments.

Simultaneous Treatments

The Dynatron Solaris allows many combinations of simultaneous treatments to be delivered at once using available channels. Simultaneous treatments are not the same as COMBO treatments. A COMBO treatment combines Ultrasound with a stim therapy into a single treatment. A COMBO treatment is always delivered to one patient. Simultaneous treatments are independent treatments that are set up separately, that have separate treatment timers, and which may be delivered to one or more patients at the same time.

There are very few limitations to the simultaneous treatments that may be set up with the Dynatron Solaris. You can set up any number of separate treatments as described below with the exceptions noted:

- **Channels 1 through 4** may be used for any number of Interferential, Premodulated, Russian or Biphasic treatments. For treatments using one channel, the device will select the next available channel. For treatments using two channels, the device will select a channel pair (1-2 or 3-4). Note: Channels 3-4 are available on Solaris 706 and 709 only.
- **Russian or Biphasic parameters** selected will apply to both channels in a channel pair (1-2, or 3-4), and you cannot have both a Russian and a Biphasic treatment on the same channel pair. Therefore, if Channel 1 is set up with a Normal mode Russian treatment, Channel 2 may then be set up with a Normal mode Russian treatment (or a Premodulated treatment), but not with a Biphasic treatment. The same is true of channel pair 3-4 available only on Solaris 706 and 709.
- A **High Volt** pads or probe treatment may be set up.
- A separate **Ultrasound** treatment may be set up, or a Combination treatment using Ultrasound and a single-channel modality.
- **The device allows only ONE attended therapy to be delivered at one time**. Attended therapies include Ultrasound, Microcurrent probe, High Volt probe, Direct Current, and Light Therapy Probe treatments. While the attended therapy is in progress, other available channels may be used for unattended treatments (subject to availability of the channel(s) needed). Although a Dynatron Xp Pad treatment is an unattended therapy, other attended treatments may not operate at the same time.
- Whenever a **Microcurrent, or Direct Current** treatment is in progress (probes or electrodes), Channel 1 is unavailable for any other use. However, Channels 2, 3, and 4 may be used for other stim treatments. Set Up A Second Treatment

To set up the second (or third) treatment, after you have set up and started the first modality, press the modality key for the second treatment to be set up. The device automatically selects the treatment channel(s) to be used. The GREEN channel light shows you the channel(s) selected for this treatment. Plug the lead or cable into the corresponding output jack(s) before you proceed with setting up the treatment. Select the treatment parameters for the second treatment following the setup instructions for that modality provided in this manual. When parameters have been entered, press START.

Note: The D701 has two attended modalities: ultrasound and light therapy. The device allows only ONE attended therapy to be delivered at one time.

Modify Simultaneous Treatments

You may VIEW and MODIFY parameters for the channel with the GREEN light. While two or more treatments may be in progress at once, the TIME display and the POWER/INTENSITY displays can show the settings for only one channel at a time. The settings displayed are for the channel with the GREEN light only. Any other channel in use at that time will have an YELLOW light to show it is active (delivering current) but its parameters are not currently displayed.

To change the settings for a channel or output that has an YELLOW light, press the CHANNEL TOGGLE key one or more times until the light for the desired channel becomes **GREEN**. You hear a beep each time you press the CHANNEL TOGGLE key. The TIME AND POWER/INTENSITY displays also change to show the parameters currently in effect for the channel indicated by the GREEN light.

CHANNEL OUTPUT INDICATOR LIGHTS	
GREEN Solid	• You **CAN see and modify** this channel's parameters. • The channel is delivering current.
GREEN Flashing	• You **CAN see and modify** this channel's parameters. • The channel is not delivering current while the light is flashing.
YELLOW Solid	• You **CANNOT see or modify** this channel's parameters at this time. • The channel is delivering current.
YELLOW Flashing	• You **CANNOT see or modify** this channel's parameters at this time. • The channel is not delivering current while the light is flashing.

Stop One Treatment

STOP ONE TREATMENT ONLY: If you have more than one treatment in progress, you can stop one treatment by either of the following methods. First, press the channel toggle key to select the channel to be stopped (that channel's light is GREEN when selected).

FUNCTION-STOP. Press and hold the FUNCTION key and press STOP to terminate selected treatment.

REDUCE THE TREATMENT TIME TO ZERO. Press the TIME DOWN ARROW until the TIME display reaches zero. The device beeps when the time reaches zero.

The output at the selected channel is stopped, and the device then displays the parameters for the next treatment that remains in progress (if any). Pressing the STOP key will stop all treatments at once.

SECTION III

CONTRAINDICATIONS, WARNINGS, AND PRECAUTIONS

Contraindications, Warnings, & Precautions

for Interferential, Premodulated, Russian, Biphasic, High Voltage Pulsed Stimulation, and Direct Current Treatments

Contraindications

Thrombosis: It is possible that the current produces chemical changes in the blood leading to alterations in the clotting time. At present there is no specific scientific evidence to support this. Nevertheless, treatment must not be given to any patient who is taking anticoagulants as it may render these ineffective. The effect of the current is on the platelets and would tend to spread any clot with perhaps fatal results in a patient with coronary thrombosis. If a patient has a history of deep vein thrombosis, even many years past, the treatment may increase rather than decrease swelling.

Implanted Electronic Devices: Patients with Implanted Electronic Devices (for example a cardiac pacemaker) should not be subjected to stimulation.

Cardiac Conditions: The electrodes should be placed to avoid the stellate ganglion and the heart itself. If there is a potential for heart problems, the clinician must exercise professional judgment and use adequate precautions. The clinician should not expose the patient to risk if possible heart problems are suspected.

Bacterial Infections: The effect on bacteria is uncertain, and it is advisable that bacterial infections should not be treated.

Malignancy: The use of Interferential, Premodulated, High Volt, Direct Current, Biphasic, or Russian Stim treatment is contraindicated in patients with clinically diagnosed cancer.

Additional warning from the Canadian Health and Welfare Department, Health Protection Branch: **WARNING: Thoracic applications are contraindicated**. Cardiac fibrillation may occur if output current is 50 mA RMS or greater for any output circuit.

Warnings

1. Adequate precautions should be taken in the case of persons with suspected or diagnosed epilepsy.
2. Severe spasm of the laryngeal and pharyngeal muscles may occur when the electrodes are positioned over the neck or mouth. The contractions may be strong enough to close the airway or cause difficulty in breathing.
3. Caution should be used in the transthoracic application of EMS devices in that the introduction of electrical current into the heart may cause arrhythmia.
4. This device should be kept out of the reach of children.
5. The Dynatron device should not be used in the following conditions:
   - Pregnancy
   - Acute and sub-acute thrombophlebitis
   - Potentially malignant lesions
   - Implants of any electrical nature
   - Do not use over a carotid sinus
   - Transcerebrally
   - Disturbances in cardiac rhythm

6. The long-term effects of chronic electrical stimulation are unknown.
7. This device should not be used to relieve pain syndromes until etiology has been established.
8. Current densities for any electrodes exceeding 2 mA r.m.s./cm^2 may require the special attention of the USER.

Precautions

1. Precautions should be observed following recent surgical procedures when muscle contractions may disrupt the healing process.
2. Some patients may experience skin irritation or hypersensitivity due to the electrical stimulation or electrical conductive medium. The irritation can usually be reduced by use of an alternate conductive medium or alternate electrode placement.
3. Interferential, Premodulated, Biphasic, Russian, Direct Current and High Volt therapy must be used cautiously in the presence of any of the following conditions:
   - When there is a tendency to hemorrhage following acute trauma or fracture.
   - Over the menstruating uterus.
4. **Use extreme caution when administering a treatment where sensory nerve damage is present or in any case where there is a loss of normal skin sensation; this includes areas desensitized by medication or ice**. When treating an area where there is loss of feeling, there is an increased danger of injuring the patient. Do not treat such areas unless you have sufficient training and experience in applying this therapy for such cases and you are confident you can deliver the treatment safely without injuring the patient.

   When treating any conditions contributing to loss of sensation, or **any time the patient cannot feel the electrical stimulation**, do not exceed an intensity setting of 12-15 when using large electrodes (3-3/4" x 1-3/4") or an intensity setting of 8-10 when using small electrodes (1-3/4" x 1-3/4"), and select short treatment times (approximately 8 minutes). Be alert for any irregularities in the skin following the treatment.

   Never use High Volt therapy to treat an area where there is a loss of normal skin sensation.
5. Do not use in general area where high-powered, high-frequency transmitting surgical units are being operated. Short wave diathermy should not be turned on or used at the same time as this Dynatron device.
6. Do not use the same power outlet or line with a whirlpool and certain traction machines. In areas which are carpeted and static electricity is present, it may be necessary to use a conductive mat or anti-static carpet treatment to remove any static charge from the operator before touching the device.
7. To avoid causing possible interference with the operation of the Dynatron device, it should not be connected to anyone who is wearing or holding an RF transmission device (two-way radio, cell phone, beeper, etc.)

Treatment Setup Warnings

1. NEVER turn the power on or off while the unit is connected to the patient.
2. Always STOP a treatment before removing or attaching electrodes or leads to the patient. Leads and electrodes must only be applied to the patient before a treatment is started.
3. Never use worn or damaged leads or electrodes as these may result in injury to the patient. Check leads using the Lead Test function provided by this device.

4. Electrodes must be attached and probe placed in contact with the patient's skin (if applicable) prior to starting a treatment.

Adverse Effects

Skin irritation and burns beneath the electrodes have been reported with the use of electrotherapy.

Caution

Any electrical stimulation has the potential to burn or irritate a patient's skin. The tendency towards burning is dependent upon several factors; the most important being patient susceptibility and current density. The practitioner has little control over patient susceptibility, other than to observe first time patients carefully. However, current density is totally controllable. It is important to note that the intensity displayed is not a measurement of the current delivered. For Interferential, Premodulated, Biphasic and Russian stim, this is a relative reading only. Current delivered at a given intensity setting is dependent upon the current setting, the size and type of electrodes used, and conductance.

Current density is the amount of current delivered, divided by the area through which the current is being delivered. Higher current density increases the tendency to burn or irritate. The current density can be reduced by decreasing the amount of current or increasing the area through which the current is being delivered. The area can be increased by using larger electrodes and/or making sure that the total area of the electrode is actually delivering current. Current density is also reduced when more electrodes are used (four instead of two).

Electrodes which are worn or have lost their adhesiveness, or carbon electrodes which are corroded and are not securely fastened, fail to deliver current evenly as required. These kinds of electrodes may have "hot spots" where higher than normal current density will be delivered. If the patient complains of "pin prick" sensations, the electrode may be delivering current through only a small portion of its area, and the electrode should be replaced.

Also see "Electrotherapy Usage Cautions" in this manual for further discussion regarding safe use of leads and electrodes.

Use Only Dynatronics Accessories

The leads and electrodes provided by Dynatronics have been tested with Dynatronics devices and are appropriate for use with these devices. Dynatronics cannot guarantee the safety or performance of leads and electrodes purchased from other vendors.

Only use electrodes which are designed for use with this device. NEVER use monitoring electrodes such as ECG, EKG, or EMG. NEVER use electrodes specified only for TENS devices as those electrodes may not be adequate for use with the electrotherapies provided by this device.

Contact Dynatronics Customer Service if you have questions about appropriate electrodes for use with this device.

Contraindications, Warnings, & Precautions for Microcurrent

Contraindications

The following treatment conditions are specifically contraindicated for MICROCURRENT, and must be excluded:

1. Any electrode placement that applies current to the carotid sinus (neck) region.
2. Any use of TENS on patients who have a demand-type cardiac pacemaker or an implanted electronic device.
3. Any electrode placement that causes current to flow transcerebrally (through the head).
4. The use of TENS whenever pain syndromes are undiagnosed, until etiology is established.

Warnings

1. The safety of TENS devices for use during pregnancy or delivery has not been established.
2. TENS is not effective for pain of central origin. (This includes headache.)
3. TENS devices should be used only under the continued supervision of a physician.
4. TENS devices have no curative value.
5. TENS is a symptomatic treatment and as such suppresses the sensation of pain which would otherwise serve as a protective mechanism.
6. Electronic monitoring equipment (such as ECG monitors and ECG alarms) may not operate properly when TENS stimulation is in use.
7. This device should be kept out of the reach of children.
8. Isolated cases of skin irritation may occur at the site of electrode placement following long-term application.
9. Effectiveness is dependent upon patient selection.
10. Some patients may experience skin irritation or hypersensitivity due to the electrical stimulation or electrical conductive medium. The irritation can usually be reduced by use of an alternate conductive medium or alternate electrode placement.

Precautions

1. This therapy must be used cautiously in the presence of any of the following conditions:
    - When there is a tendency to hemorrhage following acute trauma or fracture.
    - Over the menstruating uterus.
    - Where sensory nerve damage is present or in any case where there is a loss of normal skin sensation; this includes areas desensitized by medication.

- Do not use in general area where high-powered, high-frequency transmitting surgical units are being operated. Short wave diathermy should not be turned on or used at the same time as this Dynatron device.
- Do not use the same power outlet or line with a whirlpool and certain traction machines. In areas which are carpeted and static electricity is present, it may be necessary to use a conductive mat to remove any static charge from the operator.

Adverse Reactions

Skin irritation and burns beneath the electrodes may occur with Microcurrent treatment.

NOTE: When using Microcurrent frequencies and intensities, it is extremely unlikely that a burn may occur. However, this possibility exists under certain circumstances. For example, if a high current setting is combined with poor electrode quality and/or high current density (small current delivery area). Monitor the patient's comfort throughout the treatment and change treatment settings if the patient finds the treatment intolerable.

Contraindications, Warnings, & Precautions for Ultrasound Treatment

Contraindications

The Dynatron Solaris Ultrasound should not be applied in the following **CONDITIONS**:

- Pregnancy
- Acute and sub-acute thrombosis and thrombophlebitis
- Potentially malignant lesions, tumors malignant or benign
- Areas or lumps that may be suspected as cancerous or precancerous
- Third degree musculo-tendonous lesions
- Cardiac pacemaker or other implanted electronic device
- Implants of any electrical nature
- Skin diseases
- Multiple sclerosis
- Osteomyelitis
- Disturbances in cardiac rhythm
- Tissue or bone with acute sepsis
- Arteriosclerosis or weakened blood vessels
- Hemophilia
- Where sensory nerve damage is present with a loss of normal skin sensation.

The Dynatron Solaris Ultrasound should not be applied to the following **AREAS**:

- Transcerebrally
- To the eye
- To the ear
- Over a carotid sinus
- To the heart
- To major subcutaneous nerves and blood vessels
- To the spinal cord
- Around the bulbar area of the spinal cord
- To reproductive organs
- Over viscera (stomach, spleen, liver)
- Over epiphyseal areas of the bones in growing children
- Over stellate ganglion and subcutaneous major nerves
- To tissues previously treated by deep x-ray or other radiation
- Over the joint capsule in acute or sub-acute arthritic conditions
- Over ischemic tissue in patients with vascular disease
- Over a laminectomy site
- Over total joint replacements (the effect of Ultrasound on the new plastics is unknown)

The Dynatron Solaris Ultrasound should not be used over healing fractures.

INTENSITY (POWER) SHOULD BE REDUCED IF PATIENT COMPLAINS OF PERIOSTEAL BONE PAIN (BONE ACHE)

Precautions

The Dynatron Solaris Ultrasound devices must be used cautiously in the presence of any of the following conditions:

- When there is a tendency to hemorrhage following acute trauma or fracture.
- Acute bursitis. Do not use in continuous duty cycle mode.

Warnings

- Do not use in general area where high-powered, high-frequency transmitting surgical units are being operated. Short wave diathermy should not be turned on or used at the same time as this Dynatron device.
- Do not use the same power outlet or line with a whirlpool and certain traction machines.
- In areas which are carpeted and static electricity is present, it may be necessary to use a conductive mat to remove any static charge from the operator.
- Use a surge suppresser if power problems are encountered.
- Avoid unnecessary exposure to Ultrasound (patient and therapist).

Contraindications, Warnings, & Precautions for Solaris Light Therapy Treatments

CAUTION: The Solaris Light Therapy Probes and the Dynatron Xp Pads should be plugged into the appropriate Output Jacks, only when the Solaris device is turned OFF.

Contraindications

Do not use:

- Cancer *(tumors or cancerous areas)*
- Direct irradiation of the eyes
- Treatment of patients with idiopathic photophobia or abnormally high sensitivity to light
- Patients that have been pre-treated with one or more photosensitizers
- Direct irradiation over the fetus or the uterus during pregnancy
- Direct irradiation of the thyroid gland and endocrine glands

Precautions and Warnings

WARNING: Protective eyewear is required when using the D405 Probe. Exposure to blue light poses a risk of eye (retinal) damage.

NOTE: This therapy must be used cautiously where sensory nerve damage is present or in any case where there is a loss of normal skin sensation; including areas desensitized by medication or other therapies such as any type of cryotherapy.

- Caution, the use of controls or adjustments of performance or procedures other than those specified herein may result in hazardous radiation exposure.
- Read all instructions, precautions and contraindications carefully before beginning treatments.
- If the treatment area is larger than the size of the Probe aperture, then areas equal in size to the aperture should be treated one at a time until the entire area is covered. **Do not attempt to "bathe" the area by moving the Probe back and forth or in some other manner over the target area. Failure to make full contact with the treatment surface may result in outcomes that are less effective.** Other methods may reduce total energy absorption. If the area is large, the 8"X10" Dynatron Xp Pad may be a more appropriate treatment option.
- **DO NOT** use over open wounds unless covered with a clear sterile protective barrier. (An open wound may be treated in the non-contact mode without protective barrier however energy delivery will be diminished). Undue pressure should not be exerted on the wound bed. Caution: The probe should also be sanitized, e.g. by cleaning with methylene (alcohol) or some other standard sanitizing agent.
- Cleanse the probe after each use with a dry cloth. **Never use water or cleansing agents on the Solaris Light Probe head.** Caustic cleansers (even liquid cleansers) will cause chemical interactions with the lens coating. **The probe may be gently wiped with a lean cloth lightly dampened with Isopropyl Alcohol when a disinfectant is required.**

D890 Cleansing Instructions: To cleanse the D890 lens, use a mild antibacterial soft soap and lukewarm water on a soft cloth. Never apply soap and water directly on the lens. Gently rinse using the soft cloth damped with clean lukewarm water. Dry by blotting with a damp cloth or chamois.

- Cleanse the Dynatron Xp Light Therapy Pad by gently wiping the surface with a mild soap on a dampened soft cloth. **Never immerse the pad.** Alcohol, caustic cleansers or solvents should never be used on the pad's surface.
- Cleanse the treatment area thoroughly in order to remove all gels and lotions.
- **DO NOT** use gels in combination with light therapy. Using gels will degrade the optical coating on the lens resulting in a loss of output power and efficacy. Gels will clog the vents causing overheating and damage to the internal components. Damage caused by the use of gels and lotions may void your warranty.
- Keep the Solaris Light Therapy Probe head vents unobstructed during treatment.
- DO NOT use the Solaris Light Therapy Probes or Dynatron Xp Pad underwater.
- Avoid use over areas recently injected with or exposed to steroids.
- A potential exists for skin irritation, rash, itching, scaling swelling, burning and erythema. Discontinue use if pain, inflammation, rash, skin irritation or discomfort persists.
- Patients who are taking medications which increase light sensitivity may have adverse reactions. Consult a physician to determine the photosensitizing characteristics of a specific drug.

  Dynatron 405 Probe
  There are known medications that can cause or enhance photosensitivity to ultraviolet light. The Dynatron 405 Probe emits light that approaches or may overlap slightly into the ultraviolet spectrum. For a list of medications that may enhance photosensitivity to ultraviolet light, consult the CDHR website (US Food & Drug Administration Center for Devices and Radiological Health) at the following address:
  http://www.fda.gov/cdrh/comp/rad_nonion_products.html.
- Caution should be used in handling the Solaris Infrared Light Therapy Probes and the Dynatron Xp Infrared Light Pads to avoid inadvertent exposure to the eyes.
- Do not view with optical instruments or magnifiers. Avoid viewing laser/light probes or pads with light gathering instruments such as: binoculars, cameras, and telescopes.
- There are no serviceable parts inside the Solaris Infrared Light Probes or the Dynatron XP Infrared Light Pads.
- The Xp Light Pad should not be flexed smaller than a 5" diameter. Applying flexion that forces a diameter smaller than 5" may cause the pad to fail.
- Use of cellular phones in the vicinity of sensitive electronic devices may cause interference and device malfunction.

Laser Safety (D890 Probe)

- There is a potential hazard of eye and skin exposure to laser radiation if the included instructions are not followed.
- Never operate laser if the lens appears damaged or if any other apparent damage is observed.

- Avoid direct viewing of laser or its reflections.
- Do not point laser device at other people.
- This device is not to be opened by user. The user is not to modify the unit or remove protective covers or housings.
- Service is not to be performed other than by factory authorized personnel. There are no user serviceable parts inside the D890 probe.

SECTION IV
TECHNICAL INFORMATION

Setting Defaults

Each of the modalities has default settings that are automatically selected when you press that modality key. The default setting feature allows you to set up a treatment with common treatment parameters in just seconds. For guidance in selecting the appropriate settings for each modality, consult published medical literature.

Save New Defaults

If your most common treatment settings are different than the ones already set for this device, you can change the defaults to suit your own preferences. Setting new defaults is simple. And defaults may be changed again and again whenever needed.

1. Press the modality key desired (IFC, Premod, Russian, Biphasic, High Volt, Micro, Direct Current, or Sound).
2. Set up a treatment using your preferred settings.
3. If this is an actual treatment you may increase the intensity now (intensity is not saved with the default settings). This step is optional.
4. **PRESS and HOLD the START** key for two full seconds to **SAVE** the new settings. You will hear a beep to signal that the new settings have been saved.

If the intensity was set before you pressed the START key, the treatment will begin upon pressing START. You may proceed with delivering the treatment now, or you may stop the treatment.

Example:

If, for example, your most common Premodulated treatment uses the alternating High/Low frequency setting and you prefer to treat for 15 minutes. Set the new defaults as follows:

1. Press **PREMOD.**
2. Press the **HIGH/LOW** toggle key one or more times until both the High and the Low indicator lights are on.
3. Use the **TIME** arrow keys to change the time to 15 minutes.
4. **PRESS and HOLD the START** key for two full seconds.

NOTE: You can save defaults at any time during treatment setup or while a treatment is in progress. Select the desired channel, then press and hold the START key for two seconds. A beep confirms that the new settings have been saved. Only defaults for the selected channel are saved.

Restore Factory Defaults

If you have saved your own defaults, but would like to return ALL your default settings to those that were set at the factory, do the following:

1. Turn the machine off and wait five seconds.

2. Press and hold the START key while turning the machine back ON. Continue holding the START key down until you hear machine beep and you see the display message "RST FP" which indicates the parameters have been reset. You may now proceed with treatment setup.
3. To restore the factory defaults of only one modality, set the defaults to the settings listed below and hold down the START key until a beep is heard.

Battery Operation

Use ONLY a Dynatronics-Approved Battery

Contact Dynatronics or your Dynatronics dealer to purchase the optional battery or to obtain specifications for an acceptable battery that may be used. Do not substitute another battery without first confirming with Dynatronics that the battery you are purchasing may be used with this device.

Only use a battery that CANNOT be recharged while it is in use. Disconnect the battery charger from the AC power source before using the battery to supply power to this device.

An optional battery is available for all Solaris Series devices allowing you to deliver treatments wherever power may be unavailable or unreliable. To use the optional battery, do the following:

1. It is recommended that a battery be charged for 24 hours prior to operating the Solaris device. DISCONNECT the battery charging cable from the battery while it is in use for treatment.
2. Plug the battery adapter into the jack labeled BATT on the back of the Dynatron Solaris device.
3. Set up and deliver treatments as you normally do.
4. When available battery power is reduced to a certain level, the device will flash a message BATT LO to indicate low battery power. The treatment can continue but you will probably be unable to set up and deliver another treatment when the current treatment has ended.
5. When the available battery power becomes too low to continue operating the device, the BATT LO message is again displayed, the treatment intensity is ramped down, and the machine is then shut off. Before you can continue with battery operation of the device, you must recharge the battery. If battery power is fully depleted, the message BATT BAD is displayed to indicate either a bad battery or to indicate the battery must be recharged. Any treatments that were running at that time will stop.

Battery Requirements

- 12 volt and at least 5 amps peak current (1.5 ampere hours minimum).
- Battery adapter cord
  - Cigarette lighter plug on one end (to attach to the battery pack) and a barrel plug on the other end (to fit a .325 barrel jack).
  - The cord needs to be a high quality gauge wire. Radio Shack carries a high quality cord that is recommended. Cat. No. 270-1534D. This cord comes with a 2 amp fuse. This needs to be replaced with a 5 amp fast blow fuse.

  Note: If a low-quality gauge cord is used, you can get the BATT LO error when the battery is not low.

Battery Life

The length of time that a unit can be used with a battery pack is dependent on several factors:

- The amperage of the battery pack. Larger amperage will provide longer use.
- The modality used. Light Therapy treatments require more power than Ultrasound or Stim modalities while Ultrasound requires more power than Stim modalities.
- The intensity of the treatments - the higher the intensity, the higher the consumption of power.
- The use of multiple treatments. The more channels used, the more power is consumed.
- The amount of charge remaining on the battery.

As a general rule, the unit may be run continuously for 30 minutes to several hours depending on these factors.

CAUTION: When disposing of a used battery, follow manufacture's guidelines and comply with the laws and procedures required in your area.

General Specifications

Other ranges, accuracy and precision values that are not provided here may be obtained from Dynatronics upon request.

Dynatron Solaris Specifications

Power Requirements:	100-240 V~, 50/60 Hz
Power Consumption:	85 Watts
Fuse:	120 VAC,: T 1.6 AL slow blow; 240 V, T 0.8 AL slow blow
Dimensions:	14.32" W (36.37 cm) x 4.60" H (11.68 cm) x 12.7" D (32.26 cm)
Weight:	13 pounds (5.9 Kg)

Environmental Conditions

Transport and Storage
This equipment is capable, while packed for transport or storage, of being exposed to environmental conditions not outside the following ranges:

a) an ambient temperature range of -40°C to +70°C
b) a relative humidity range of 10% to 100% including condensation
c) an atmospheric pressure range of 500 hPa to 1060 hPa

Operation
This equipment complies with requirements for operation in normal use under the least favorable combination of the following environmental conditions:

a) an ambient temperature range of +10°C to +40°C
b) a relative humidity range of 30% to 75% including condensation
c) an atmospheric pressure range of 700 hPa to 1060 hPa

Safety Features of the Dynatron Solaris

- Double redundancy protection on output amplifiers.
- Current sensing. If current reaches the current limit for the device, intensity is automatically reduced.
- All intensity levels are automatically set to zero at the end of treatment (ensures proper setting of intensity levels for the next patient).
- Internal surge protection protects against line noise, machine switching operation and any other type of interference that could cause patient discomfort.
- Soundhead temperature monitoring prevents the soundhead from becoming too hot, both to protect the soundhead crystal from damage and to ensure patient comfort.

Care and Cleaning Instructions

- Cleanse the outer surface of the Dynatron Solaris devices with a slightly damp or lightly moistened cloth. Mild household cleaners work well on the frame, but do not use cleaners on the display windows. Do not spray the solution directly on the unit.

First moisten the cloth and then wipe the unit off. Solvents, caustic solutions and harsh or abrasive cleaners must never be used.

- Cleanse the Light Therapy probes after each use with a dry cloth. **Never use water or cleansing agents on the Cluster Probe head.** Caustic cleansers (even liquid cleansers) will cause chemical interactions with the lens coating. **The probe may be gently wiped with a clean cloth lightly dampened with isopropyl alcohol when a disinfectant is required.**

  D890 Cleansing Instructions: To cleanse the D890 lens, use a mild antibacterial soft soap and lukewarm water on a soft cloth. Never apply soap and water directly on the lens. Gently rinse using the soft cloth damped with clean lukewarm water. Dry by blotting with a damp cloth or chamois.
- Cleanse the Dynatron Xp Light Therapy Pad by gently wiping the surface with a mild soap on a dampened soft cloth. **Never immerse the pad.** Solvents, caustic cleansers, or alcohol should never be used on the pad's surface.
- Avoid stretching cords to full length, bending cords sharply or wrapping cords tightly. Undue stress on cords can damage connections.
- Keep all food and drinks away from the machine and its accessories; spills can cause costly damage to the machine and repairs for this type of damage are not covered by the warranty.
- Do not drop the unit or the soundheads as severe damage will occur.
- Ultrasound heads should be cleaned with warm water. Always keep the head free from gel buildup. Alcohol may be used to sterilize the soundhead.
- Do not use ice water for cooling soundheads. Do not allow soundheads to overheat repeatedly. This could result in thermal shock to the crystal. Damage of this type is not covered by the warranty.
- Do not attempt to sterilize the device or its probes or pads, using any type of sterilization equipment including autoclaves.

Suggested Maintenance Schedule

Service To Be Performed By A Technician:

Every 6 Months
- Test leads and carbon electrodes. Lead resistance should be less than 10% above the mean cable resistance. Greater values indicate strand breakage and lead should be replaced.

Annually
- Annual Ultrasound calibration should be performed by a qualified technician.
- Check the output voltages and currents on all outputs.
- Inspect soundhead connectors on unit and on soundhead.
- Verify DAC calibration and current limits.
- It is recommended that the Solaris device be sent to the manufacturer for annual calibration including the Solaris Light Therapy Probes.

Maintenance Performed By User:

1. Inspect accessories daily for wear and damage. Examine cables and connectors on the cables for any visible sign of wear or damage. Replace accessories as needed:

- Replace lead wires and carbon electrodes at least every six months.
- Replace self-adhesive electrodes after not more than 15 uses.

2. Examine Ultrasound heads periodically for cracks which may allow ingress of conductive fluid.
3. If a machine or soundhead is dropped, or if it sustains damage due to lightning, severe power surge, submersion in water, or other incident that could cause damage to electronic components, the device must be examined by a Dynatronics technician before being returned to clinical use.
4. For older devices contact Dynatronics or your Dynatronics dealer for information and pricing for current upgrades to your device. Even if the machine is functioning properly, you can send it to Dynatronics for preventative maintenance service for a nominal charge; call for pricing.
5. Inspect device air vents periodically to ensure air flow is not blocked. An ordinary household vacuum hose may be used to clean dust from air vents externally.
6. Immediately report any device malfunction to Dynatronics Customer Service Department.
7. WARNING: Hazardous electrical output. CAUTION: To reduce the risk of electrical shock, do not remove cover. Refer servicing to qualified service personnel.

WARNING: For continued protection against risk of fire, replace fuses only with type IEC 127. For 120VAC supply, use 250w, 1.6a slow-blow. For 24VAC supply, use 250 V, 0.8A slow-blow.

NOTE: <u>BEFORE</u> sending a device to Dynatronics for service, you must FIRST obtain a return authorization number. Call your Dynatronics' Dealer for assistance. If unable to reach your Dynatronics' Dealer, call Dynatronics' Customer Service Department at (800) 874-6251 and discuss any problems or required service to save time and ensure the machine is returned to you as quickly as possible. See Section below "Returning a Unit for Repair."

Routine Ultrasound Calibration Inspections for Solaris

Government agencies regulate the frequency at which Ultrasound units must have their calibration checked. The device must still be examined at the periodic intervals specified by the governing agency for the country in which the device is used.

To have the inspection performed by Dynatronics contact Dynatronics' Customer Service Department. The device will need to be shipped to Dynatronics for the inspection. As an alternative, these periodic checks may be performed in your own locale by an independent contractor who is expert in checking the calibration of Ultrasound equipment.

The calibration procedure MUST be performed by a qualified Ultrasound technician using the proper equipment, and is recommended every 6 to 12 months.

Software Updates

Software updates may possibly be made available by the manufacturer for this device in the future. A software update is installed in the Dynatron Solaris using a cable linked to a computer. Should updated software become available, the update may only be installed by Dynatronics or by a representative or technician under the supervision of Dynatronics.

CAUTION: Following software installation, factory default settings for the Dynatron Solaris must be restored before using the device. To restore factory defaults, begin with the Dynatron Solaris powered off. Then, press and hold the START key while turning power on to the device. Continue holding the Start key down until a beep is heard indicating the factory defaults have been restored. You may then reset customized default settings if desired.

NOTE: This software update information is provided for information only and is not intended to imply that software updates will, in fact, become available for this device.

Returning a Unit for Repair

Return Authorization

If it becomes necessary to return a Solaris unit for repair, contact your Dynatronics' Dealer for assistance. If unable to contact your Dynatronics' Dealer, call Dynatronics' Customer Service (800) 874-6251. The following information must be supplied when calling Dynatronics' Customer Service to obtain a return Service Order Number (SVO):

1. User name and address
2. User phone number
3. Serial number of the unit
4. A description of the problem with the unit

After receiving the Service Order Number (SVO), the number should be clearly written on the outside of the shipping container.

Packaging and Shipping of Replacement Parts

All defective or broken parts should be shipped back to Dynatronics in the original shipping container. These containers are designed to withstand the punishment of shipping. If the original containers are not usable, find containers that are similar in protection so damage in shipping will be prevented. The person or company sending the unit to Dynatronics is responsible for any shipping damage resulting from a poorly packaged part or unit.

Definition of Symbols and Labeling

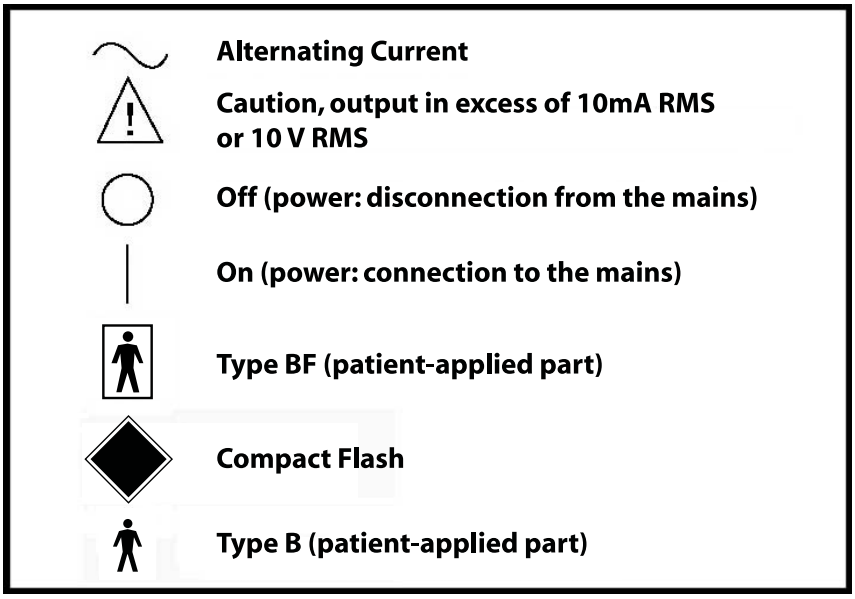
Some or all of the following symbols are included in the labeling for this device. Definitions accompany each symbol.

Made in USA

Dynatronics Corp.

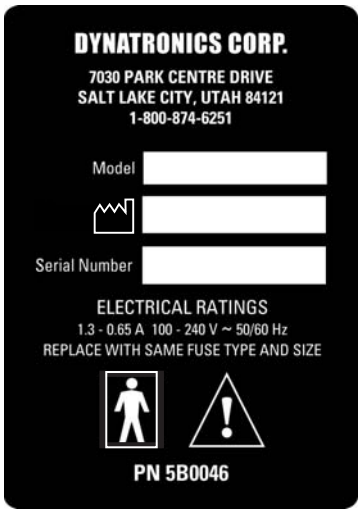
C US

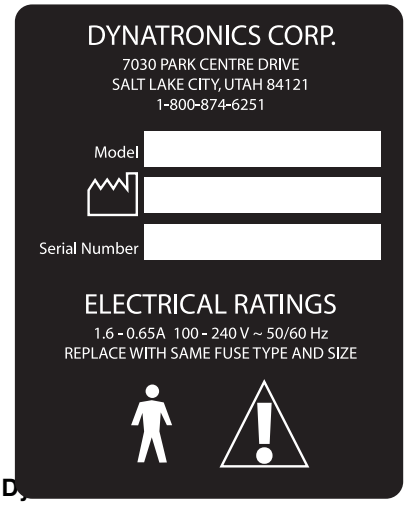
Canadian Standards Association

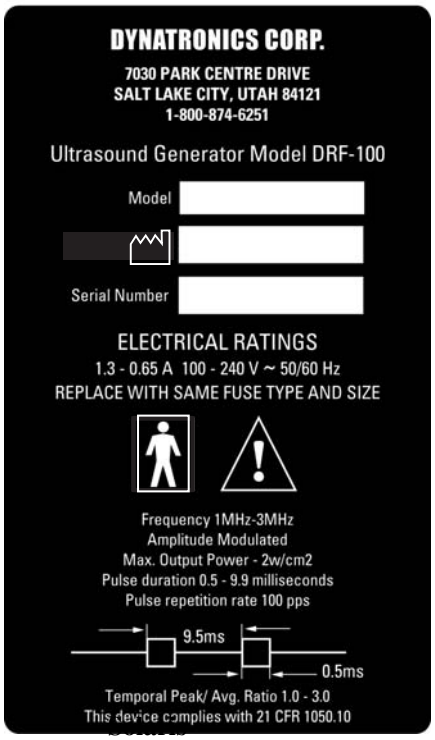

Alternating Current
Caution, output in excess of 10mA RMS or 10 V RMS
Off (power: disconnection from the mains)
On (power: connection to the mains)
Type BF (patient-applied part)
Compact Flash
Type B (patient-applied part)

CE 0344

European Standards
Medical Device Directive

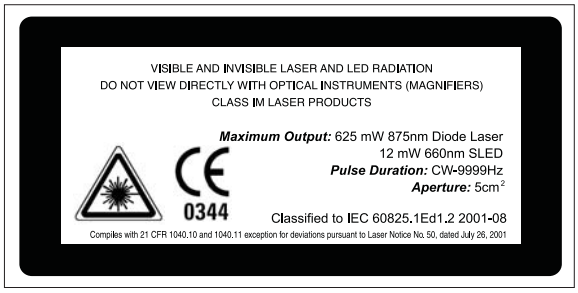






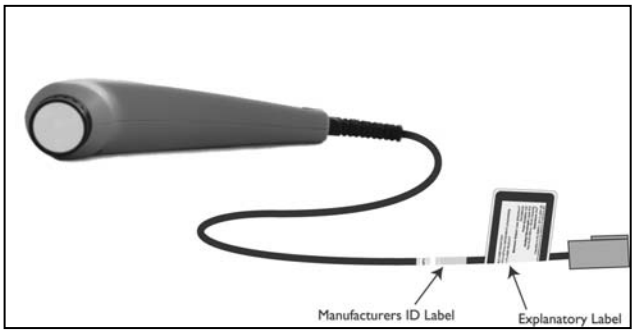
The following labels appear on the cords of the Solaris Infrared Light Therapy Probes and the Dynatron Xp Pads.

Manufacturers ID Label
D890, D880 Plus, D405 and Dynatron Xp


VISIBLE AND INVISIBLE LASER AND LED RADIATION
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS (MAGNIFIERS)
CLASS IM LASER PRODUCTS
Maximum Output: 625 mW 875nm Diode Laser
12 mW 660nm SLED
Pulse Duration: CW-9999Hz
Aperture: 5cm²
0344
Classified to IEC 60825.1Ed1.2 2001-08
Complies with 21 CFR 1040.10 and 1040.11 exception for deviations pursuant to Laser Notice No. 50, dated July 26, 2001

Explanatory Label
D890 Probe

Manufacturers ID Label
D880 and Solaris Ultrasound Heads



Label Placement

Equipment Classification

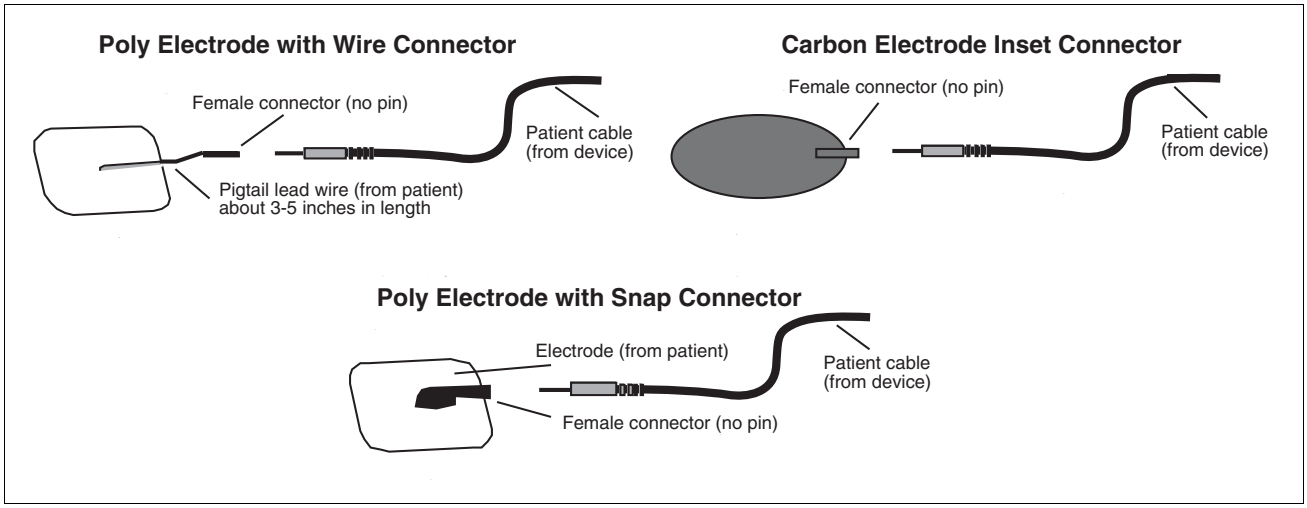
This device is classified as follows:

- Protection against electric shock: Class I (protectively earthed enclosure)
- Protection against electric shock: Type BF (floating patient-applied part)
- Protection against harmful ingress of water: none
- Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Mode of operation: Continuous operation

Disposal of Equipment and Accessories

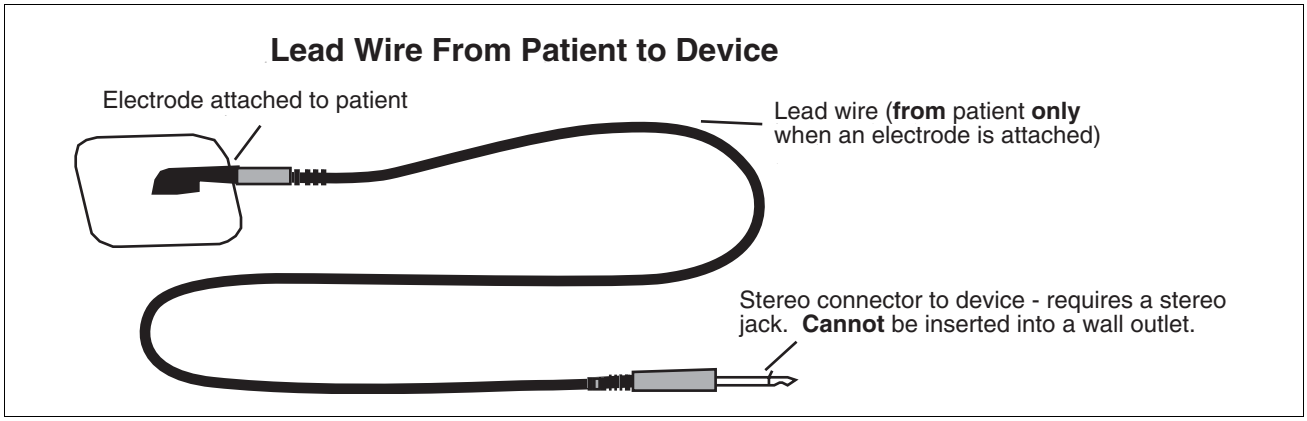
There is no risk posed in disposal of this equipment or its accessories. These items contain no hazardous materials. For disposal of accessory batteries see manufacturer's instructions and follow applicable laws and regulations in your area.

Dynatronics Electrodes and Lead Wires



The FDA has issued a Public Health Advisory regarding "Unsafe Electrode Lead Wires and Patient Cables Used with Medical Devices." This warning pertains specifically to lead wires with unprotected pins; that is, leads with one end connected to the patient and the other end having pins that can be inserted directly to a power source such as a wall AC outlet. The diagrams on this page illustrate the compliance of configurations using Dynatronics electrodes and lead wires.

Neither the Poly electrodes with snap adapters nor carbon electrodes have lead wires or pins that could allow direct connection to a power source. Ultra Polys electrodes with wire connector have a short pigtail (3 to 5 inches in length); the pigtails have female connectors. Since all Dynatronics electrodes have either no lead wire at all or very short pigtail lead wires, it is impossible to connect an electrode directly to an improper power source when the electrode alone is attached to the patient.


Lead Wire From Patient to Device
Electrode attached to patient
Lead wire (**from** patient **only**
when an electrode is attached)
Stereo connector to device - requires a stereo
jack. **Cannot** be inserted into a wall outlet.

When the electrode is connected to a patient lead wire as shown in the diagram above, the stereo jack at the opposite end of the lead wire prevents connection of the cable to any power source other than a stereo jack as found on Dynatronics devices. The stereo connector is 1/4" in diameter and cannot be inserted directly into an AC power source. **NOTE: As of May 9, 2000 new FDA compliant lead wires are available from Dynatronics and are included with all new devices.**

Additional Technical Information Available (for Technicians Only)

Dynatronics will make available on request circuit block diagrams, component part lists, descriptions, calibration instructions or other information which will assist the user's appropriately qualified technical personnel to repair those parts of the equipment which are designated by Dynatronics as repairable and which will not violate protection of Dynatronics' proprietary information.

SECTION V

SCHEMATICS AND QC CHECK LISTS

Dynatron Solaris 701-705-706-708- 709

Quality Check Sheet

Unit Serial Number_____ Software Version_____

Date _____/_____/_____ Repair_____ RS_____ Production_____

	TECH Initials	QC Initials
1. **GENERAL VERIFICATION**		
a) Verify all keys work and have good tactile feel	[ ]	[ ]
b) Verify all LED's light up (green/orange)	[ ]	[ ]
c) Verify output turns OFF when STOP is pressed	[ ]	[ ]
d) Verify output will TIME OUT	[ ]	[ ]
2. **INTERFERENTIAL: 42-55 Vpp**	[ ]	[ ]
a) Static-High/Low (all channels) ± 4 Vpp		
b) Target/Sweep (all channels)		
c) Modify Features (mode, time, function, cancel)		
d) Verify current limit 50mA maximum		
e) Verify conductance		
3. **PREMODULATED: 42-55 Vpp**	[ ]	[ ]
a) High/Low (all channels)		
b) High/Low alternating (all channels)		
c) Modify Features (mode, time, cancel)		
d) Verify current limit 50mA maximum		
e) Verify conductance		
4. **RUSSIAN STIM: 42-55 Vpp**	[ ]	[ ]
a) One Channel Normal (all channels)		
b) Two Channel Reciprocal (channel pairs)		
c) Two Channel Co-Contraction (channel pairs)		
d) Verify current limit 50mA maximum		
5. **BI-PHASIC: 42-55 Vpp**	[ ]	[ ]
a) One Channel Normal (all channels0		
b) Two Channel Reciprocal (channel pairs)		
c) Two Channel Co-Contraction (channel pairs)		
d) Verify current limit 50mA maximum		
6. **MICROCURRENT PADS**	[ ]	[ ]
a) Verify at 10uA +/- 10% and at 990uA +/- 1%		
b) Verify the polarity changes		
c) Verify conductance		
d) Verify audible tone		

7. **HIGH VOLT PADS** [ ] [ ]
   a) Without load, verify 500 volts (-10%)
   b) Verify that polarity changes

8. **MILTI-STIM PROBE** [ ] [ ]
   Direct Current
   a) Verify DC output of 0-20mA
   b) Verify DC polarity change

   High Volt [ ] [ ]
   a) Verify High Volt output of 150 V
   b) Verify High Volt polarity change

   Microcurrent [ ] [ ]
   a) Verify Microcurrent output
   b) Verify Microcurrent polarity change
   c) VERIFY Microcurrent audible tone

   General Verification [ ] [ ]
   a) Verify UP/DOWN key works
   b) Verify ON/OFF key works
   c) Verify conductance

9. **Infrared Light Cluster Probe** [ ] [ ]
   a) Verify ON/OFF key works
   b) Verify LEDs work
   c) Verify Fan is operational
   d) Verify treatment will TIME OUT

10. **Chassis Leakage**
    Chassis leakage not to be greater than 100uA, Leads 10uA:
    Leakage no ground chassis_____ leads_____
    Leakage grounded chassis_____ leads_____
    Hot/Return reversed chassis_____ leads_____

11. **Ground Fault**
    Chassis leakage not to be greater than 100uA, Leads 10uA:
    Leakage no ground chassis_____ leads_____
    Leakage grounded chassis_____ leads_____
    Hot/Return reversed chassis_____ leads_____

12. **Earth**
    Chassis leakage not to be greater than 100uA, Leads 10uA:
    _____

ACCEPTANCE:

Technician _____ Date_____/_____/_____

QC Inspector _____ Date_____/_____/_____

Ultrasound Quality Check Sheet

a)	Verify coupling bar graph works	[ ]	[ ]
b)	Verify soundhead serial number	[ ]	[ ]
c)	Combo with Stim: Verify Stim output through soundhead, using combo cable	[ ]	[ ]
d)	Verify Ultrasound output power (for each head) per table below:	[ ]	[ ]

2cm Soundhead	1 Watt (.05)	2 Watts (1.0)	4 Watts (2.0)
1 MHz	0.9 – 1.1	1.9 – 2.1	3.9 – 4.1
2 MHz	0.9 – 1.1	1.9 – 2.1	3.9 – 4.1
3 MHz	0.9 – 1.1	1.9 – 2.1	3.9 – 4.1

5cm Soundhead	2.5 Watts (.05)	5 Watts (1.0)	10 Watts (2.0)
1 MHz	2.4-2.6	4.9 – 5.1	9.8 – 10.2
2 MHz	2.4-2.6	4.9 – 5.1	9.8 – 10.2
3 MHz	2.4-2.6	4.9 – 5.1	9.8 – 10.2

10cm Soundhead	5 Watts (.05)	10 Watts (1.0)	20 Watts (2.0)
1 MHz	4.9 – 5.1	9,8 – 10.2	19.0 – 20.4
2 MHz	4.9 – 5.1	9,8 – 10.2	19.0 – 20.4
3 MHz	4.9 – 5.1	9,8 – 10.2	XXXXXX

ACCEPTANCE:

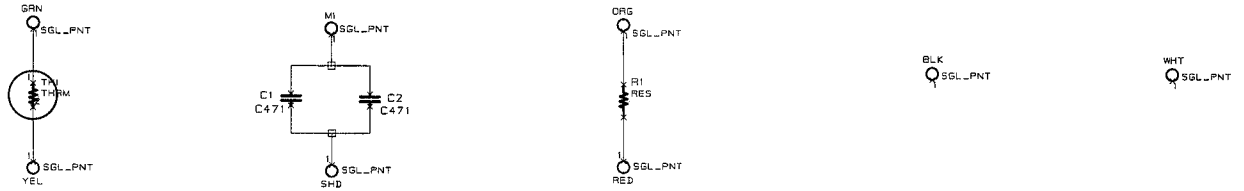
Technician _____ Date_____/_____/_____

QC Inspector _____ Date_____/_____/_____

Schematic Drawings

Schematic drawing for the Solaris Series are found on the following 16 pages.

MASTER



DYNATRONICS INC			
APPROVALS	DATE	5CM/10CM SOUNDHEAD BD	
R&D DJP	20 Nov 03	DRAWN BGJ	7E017B	REV. A1
MGR RJA	11/24/03		
SERVICE TK	11-21-03	Nov 19, 2003	SHEET 1 OF 1

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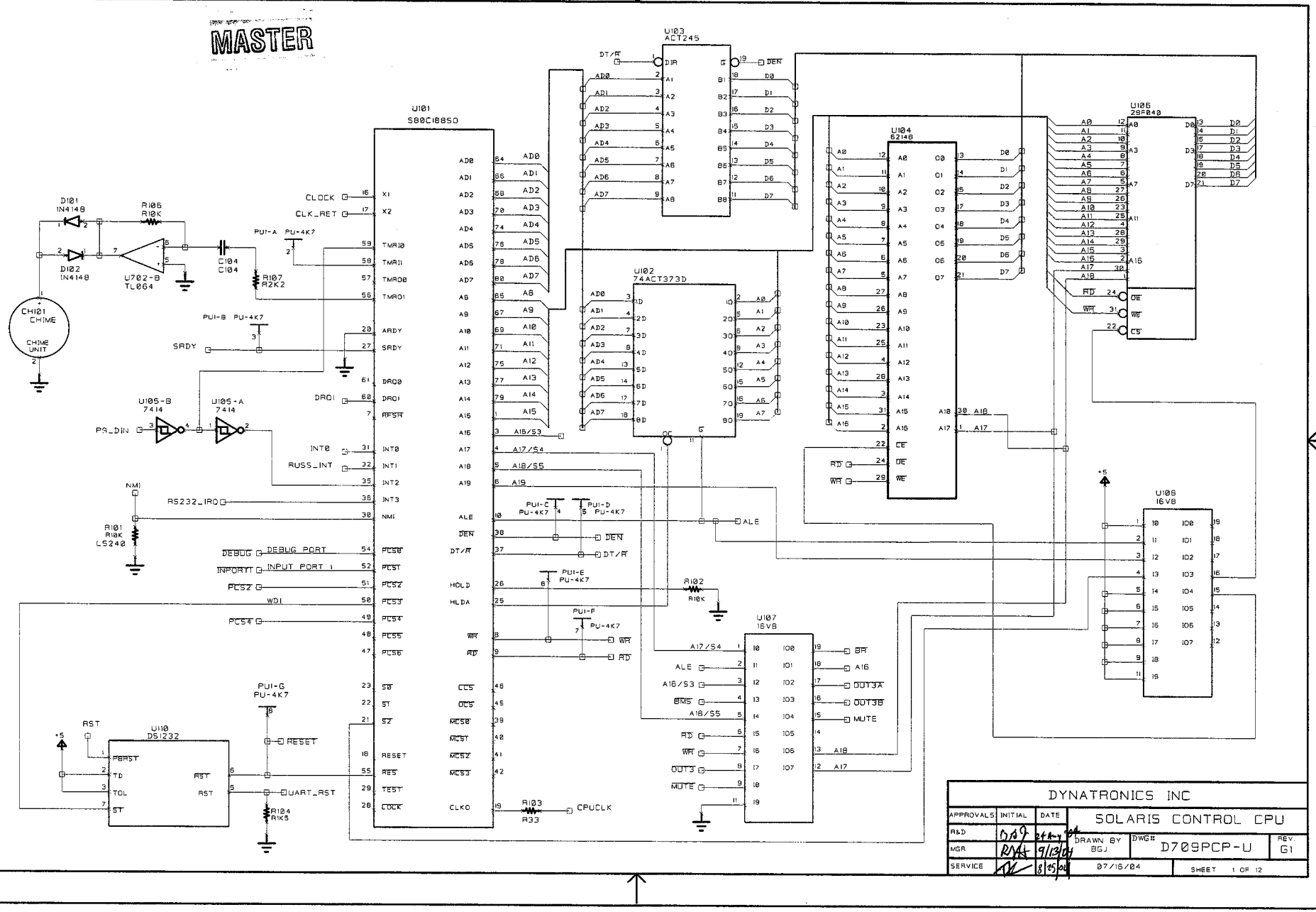

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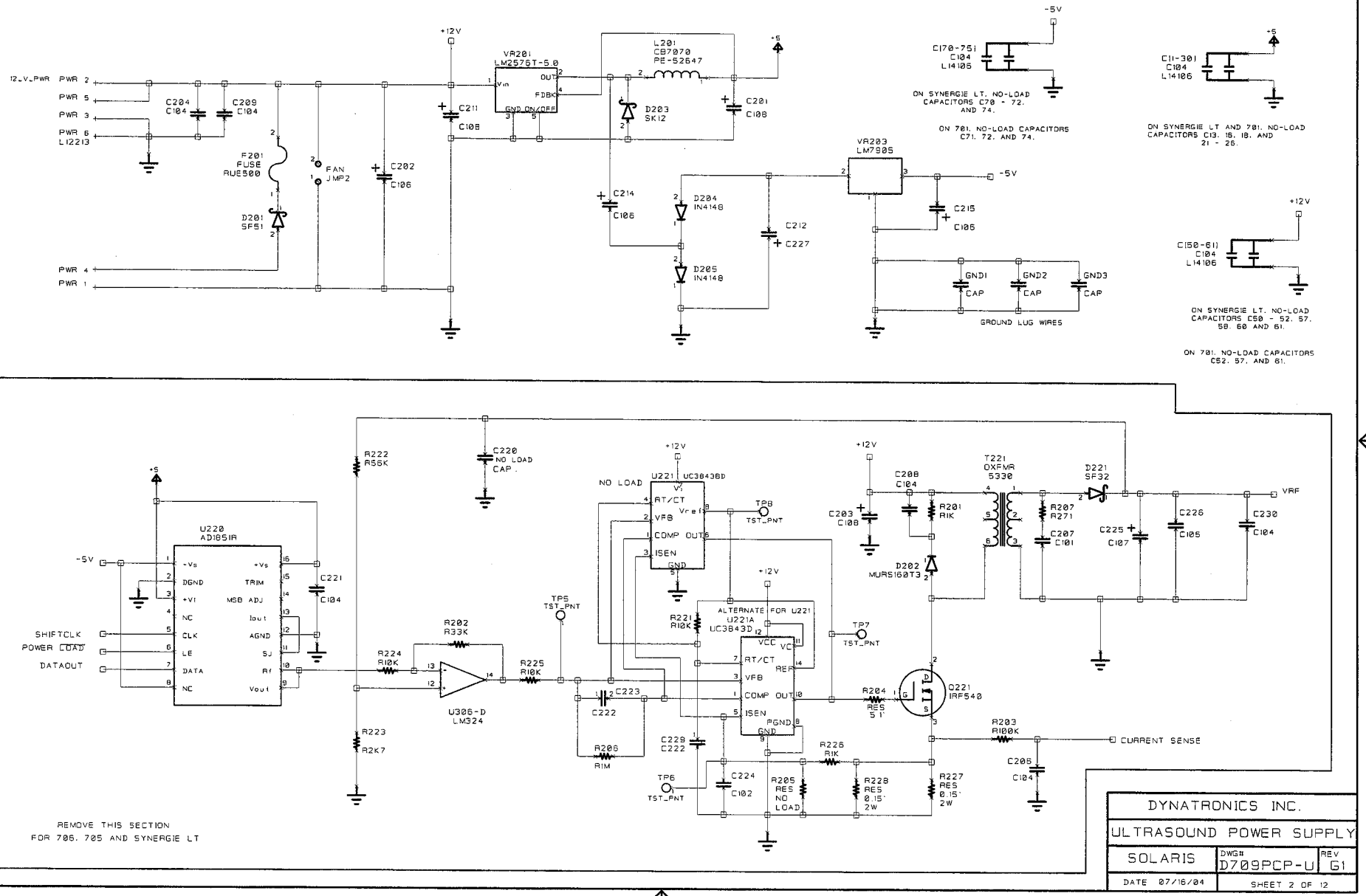

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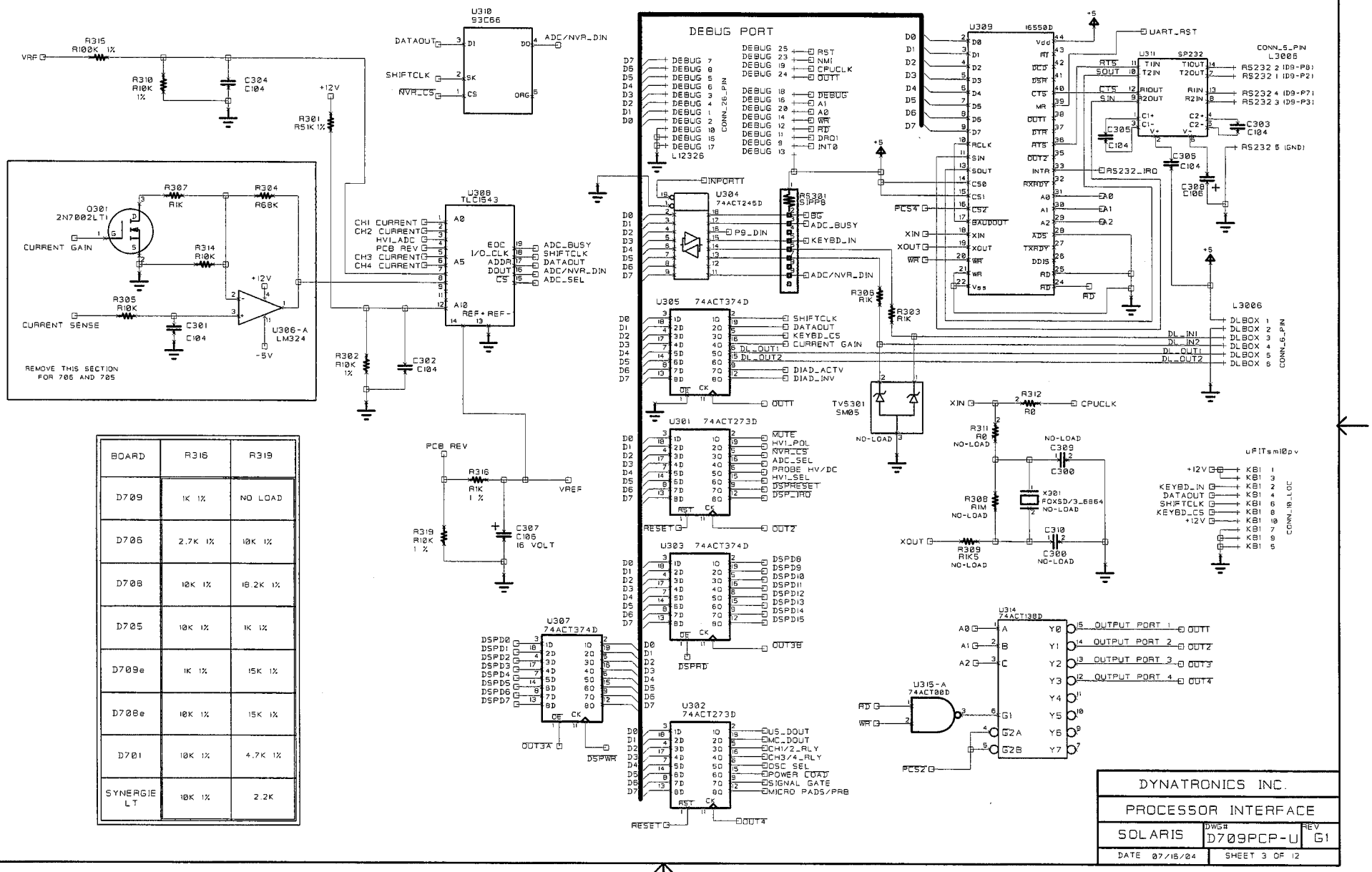
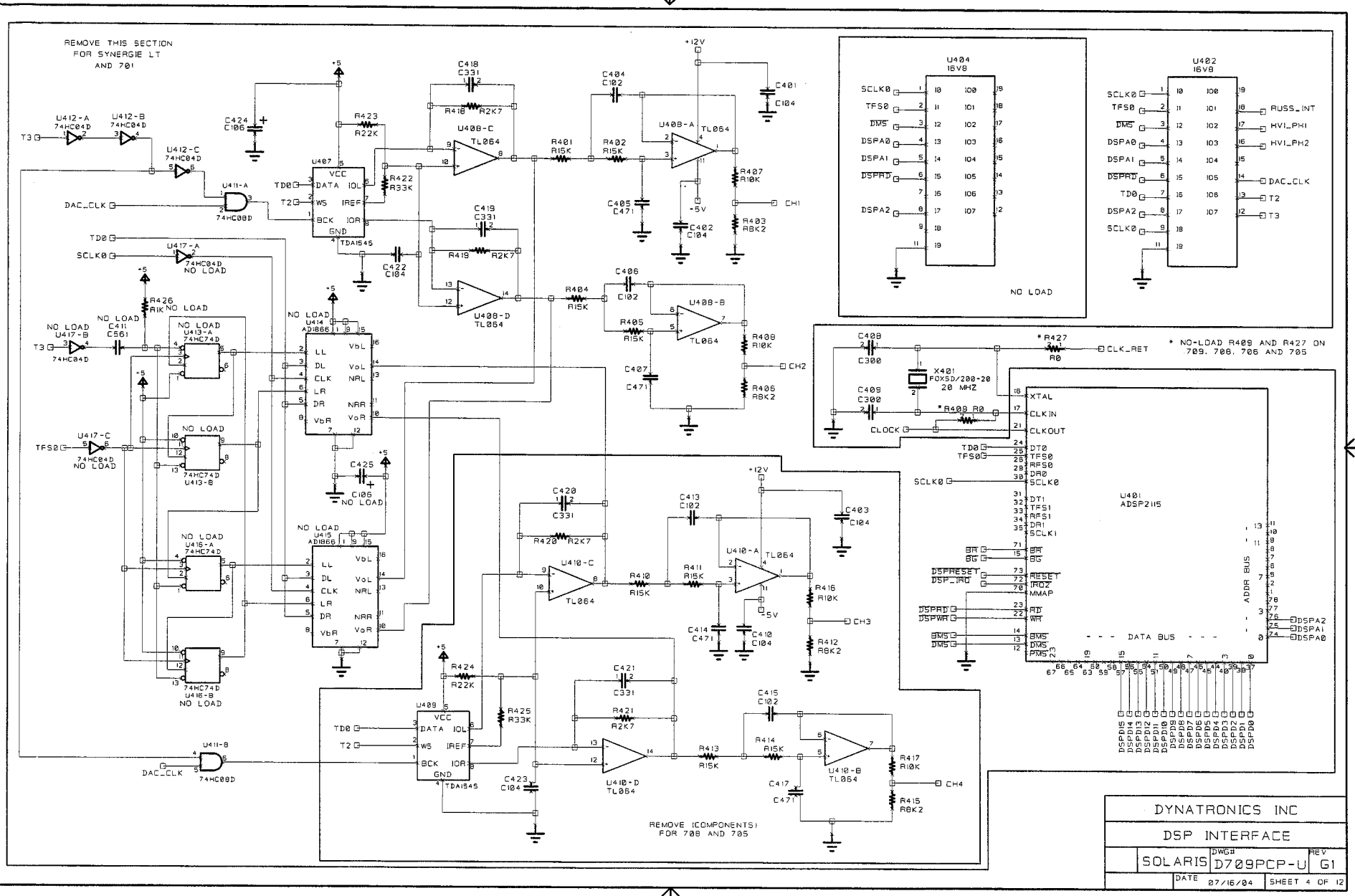


BOARD	R316	R319
D709	1K 1%	NO LOAD
D706	2.7K 1%	10K 1%
D708	10K 1%	18.2K 1%
D705	10K 1%	1K 1%
D709e	1K 1%	15K 1%
D708e	10K 1%	15K 1%
D701	10K 1%	4.7K 1%
SYNERGIE LT	10K 1%	2.2K

CONFIDENTIAL



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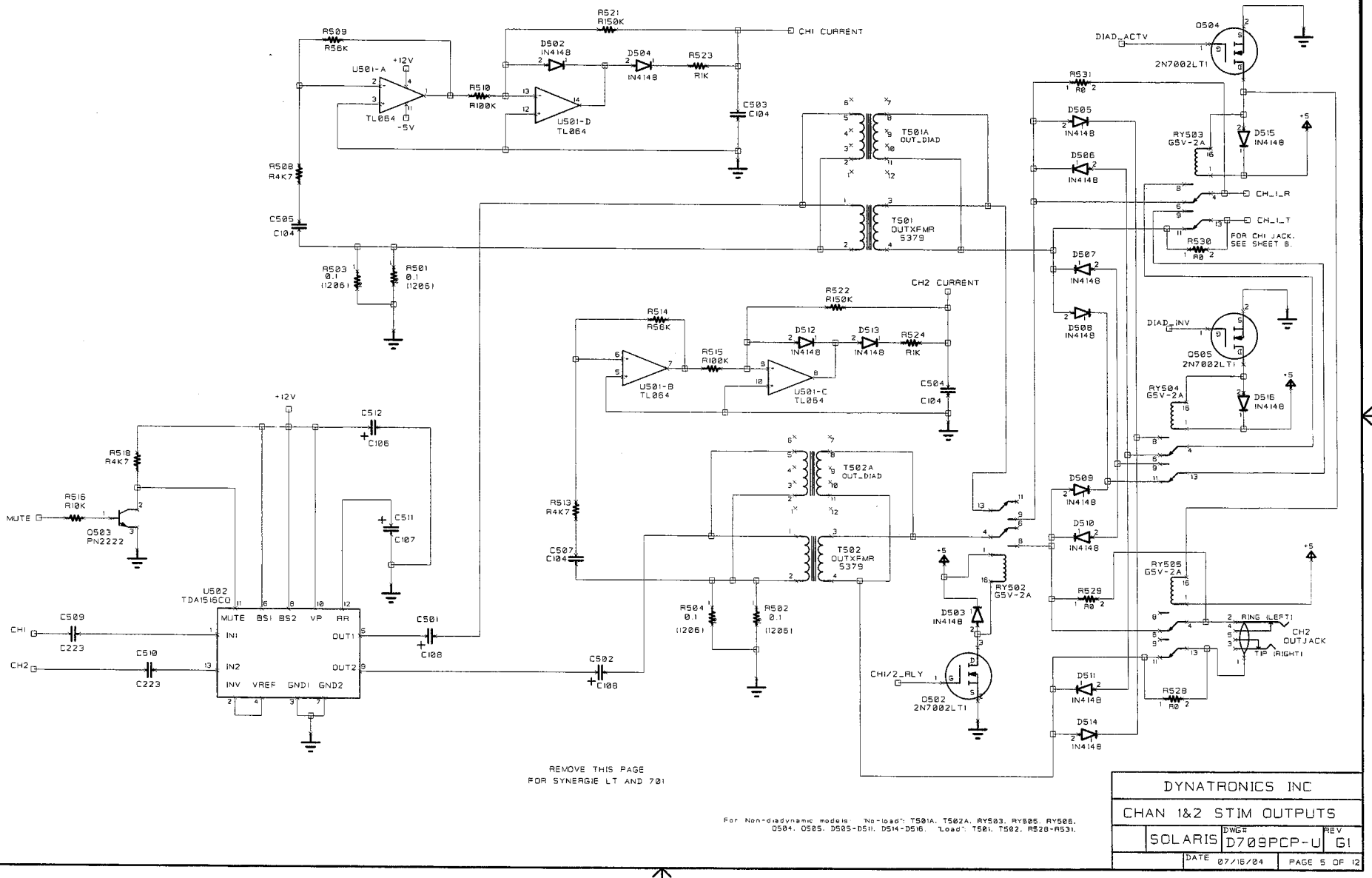
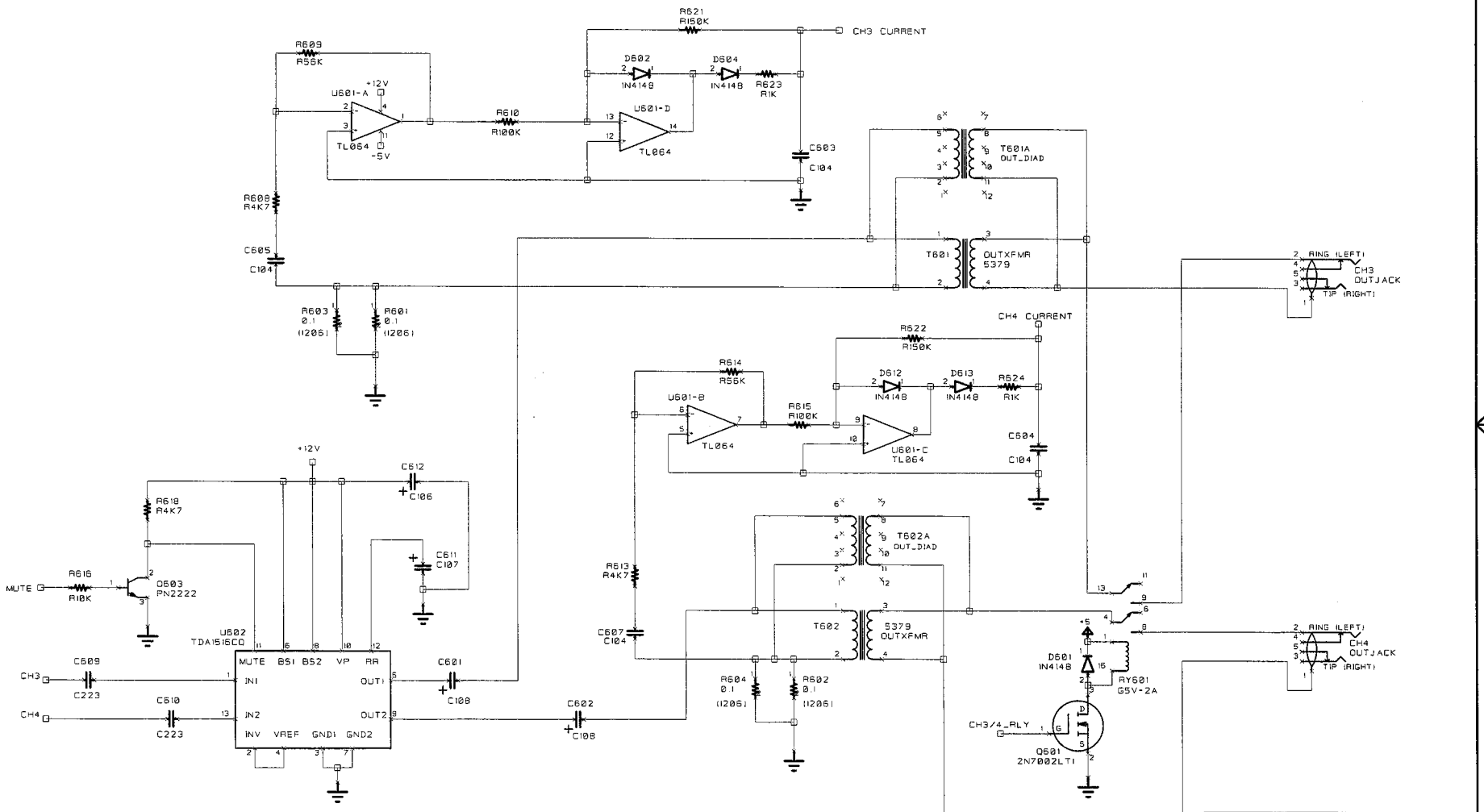
CONFIDENTIAL



For Non-diadynamic models - No-load: T501A, T502A, RY503, RY505, RY508, Q504, Q505, D505-D511, D514-D516. Load: T501, T502, R528-R531.

DYNATRONICS INC			
CHAN 1&2 STIM OUTPUTS			
	SOLARIS	DWG# D709PCP-U	REV G1
		DATE 07/16/04	PAGE 5 OF 12

CONFIDENTIAL



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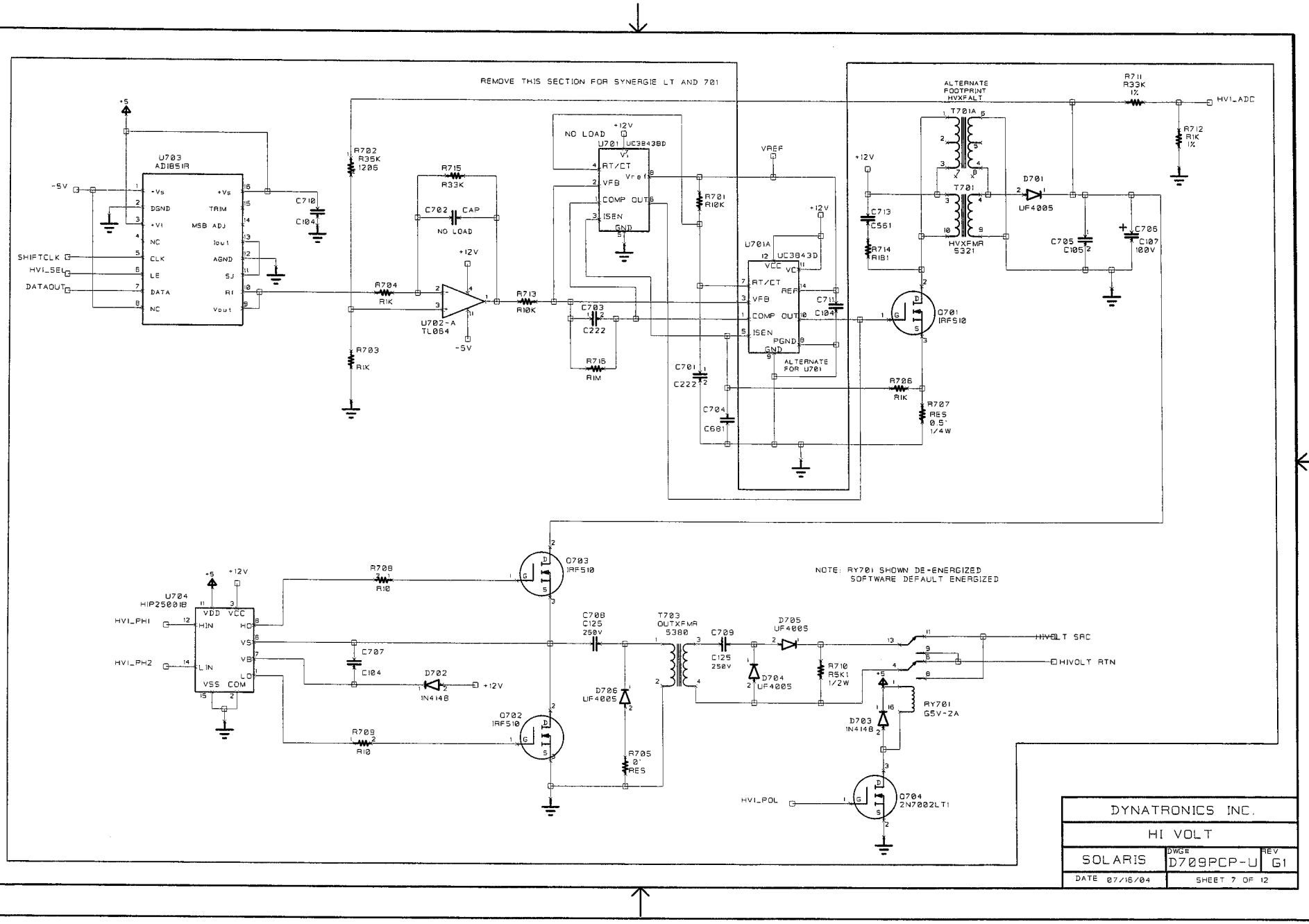

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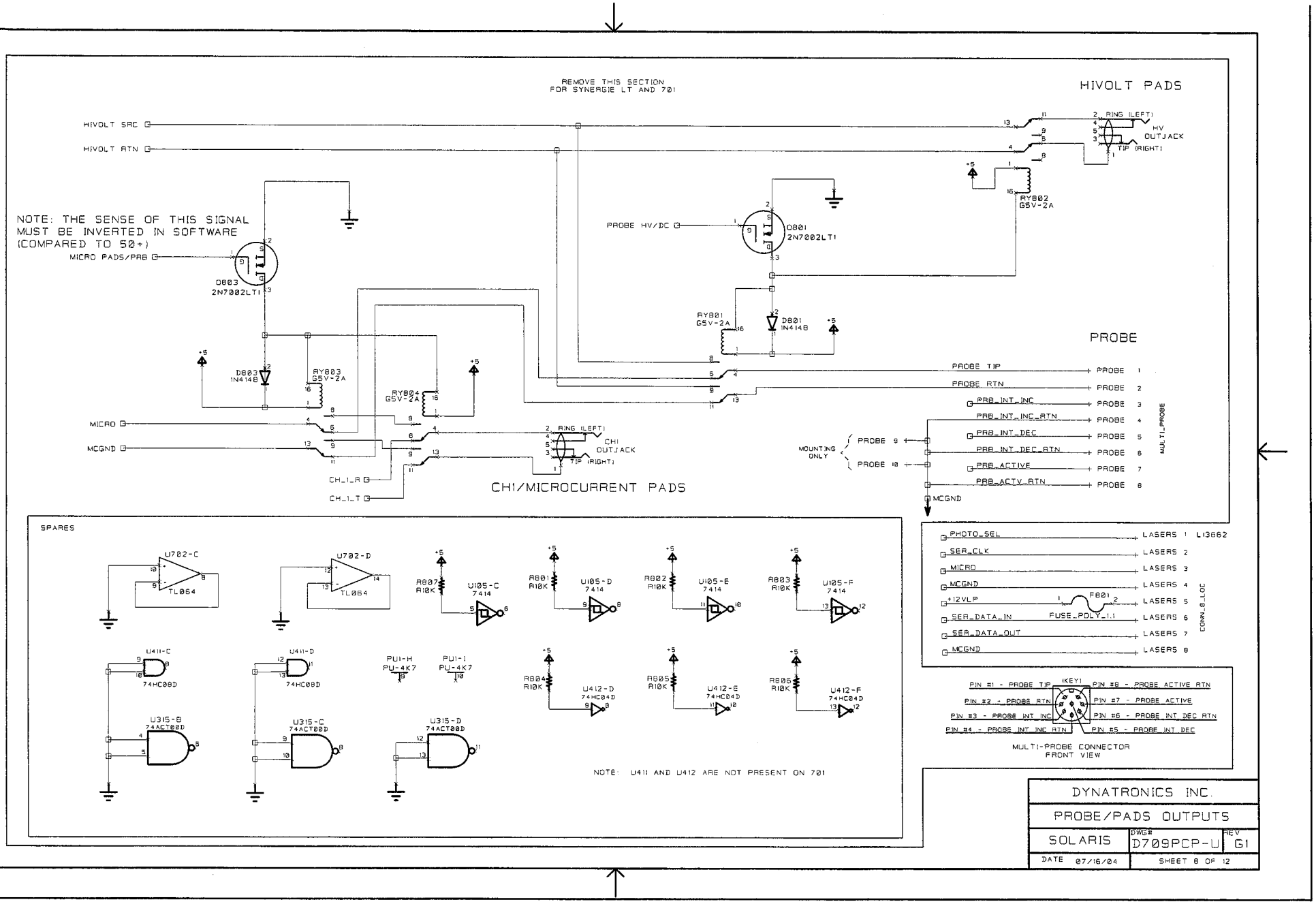

150

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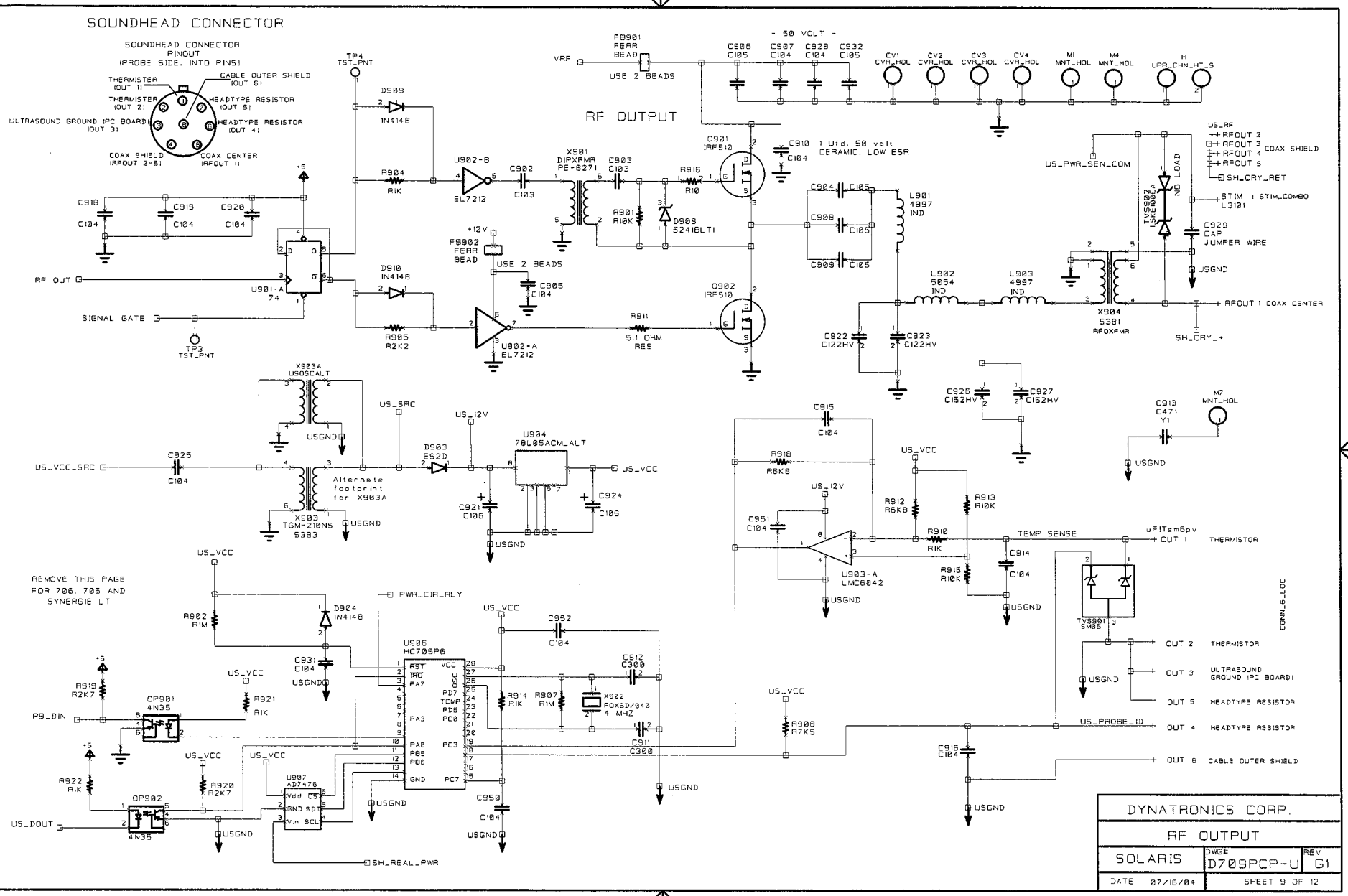

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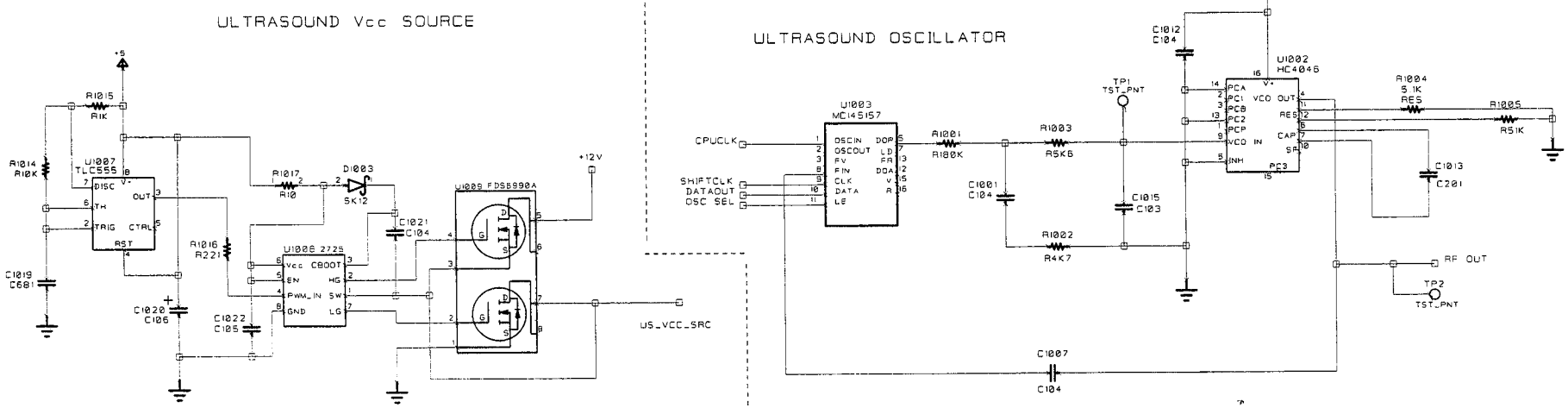
CONFIDENTIAL

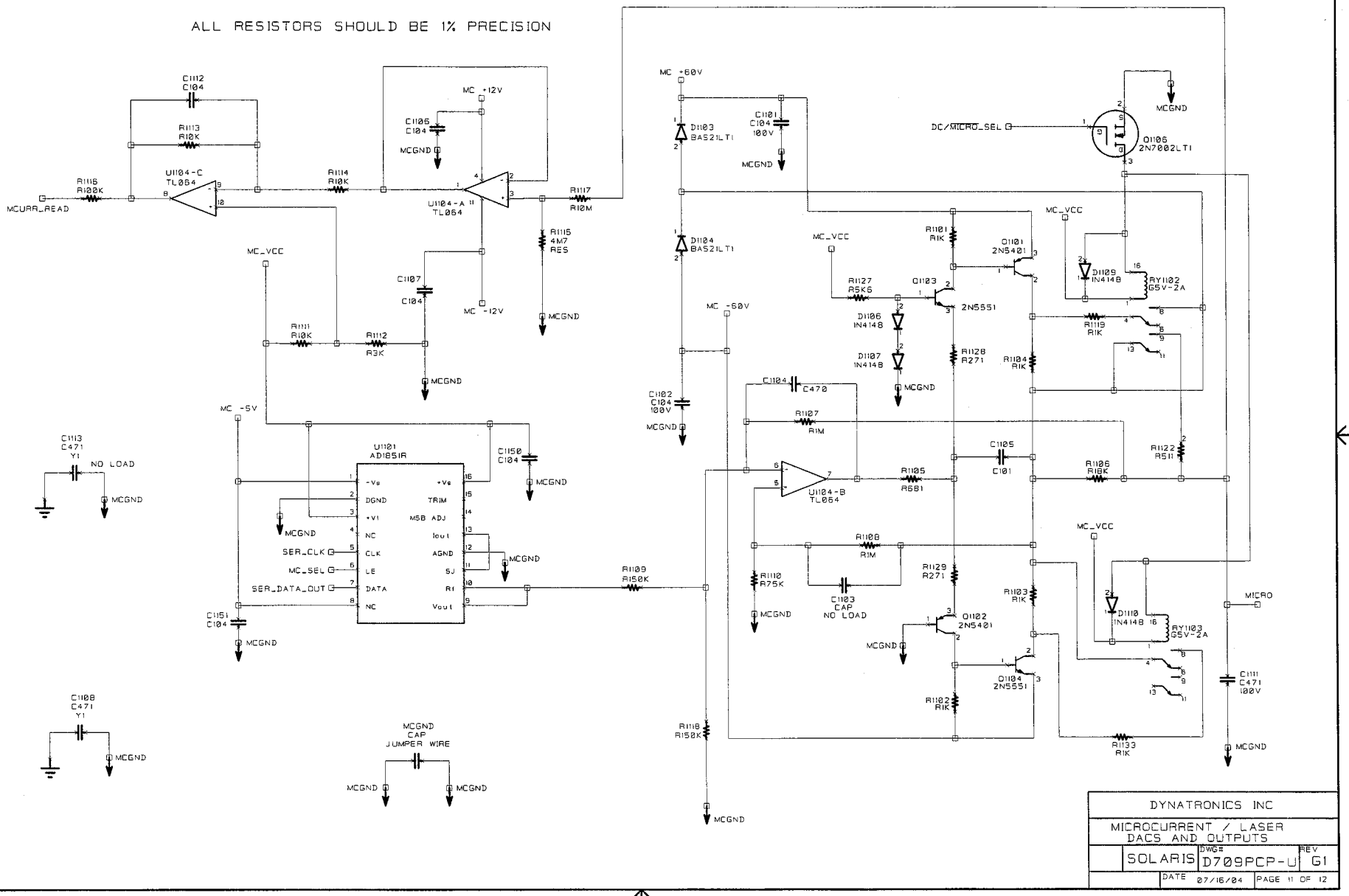


PATENT PENDING
CONFIDENTIAL

REMOVE THIS PAGE
FOR 706, 705 AND
SYNERGIE LT

DYNATRONICS INC.		
US OSCILL & POWER MONTR		
SOLARIS	DWG# D709PCP-U	REV G1
DATE 07/16/04	SHEET 10 OF 12	

CONFIDENTIAL



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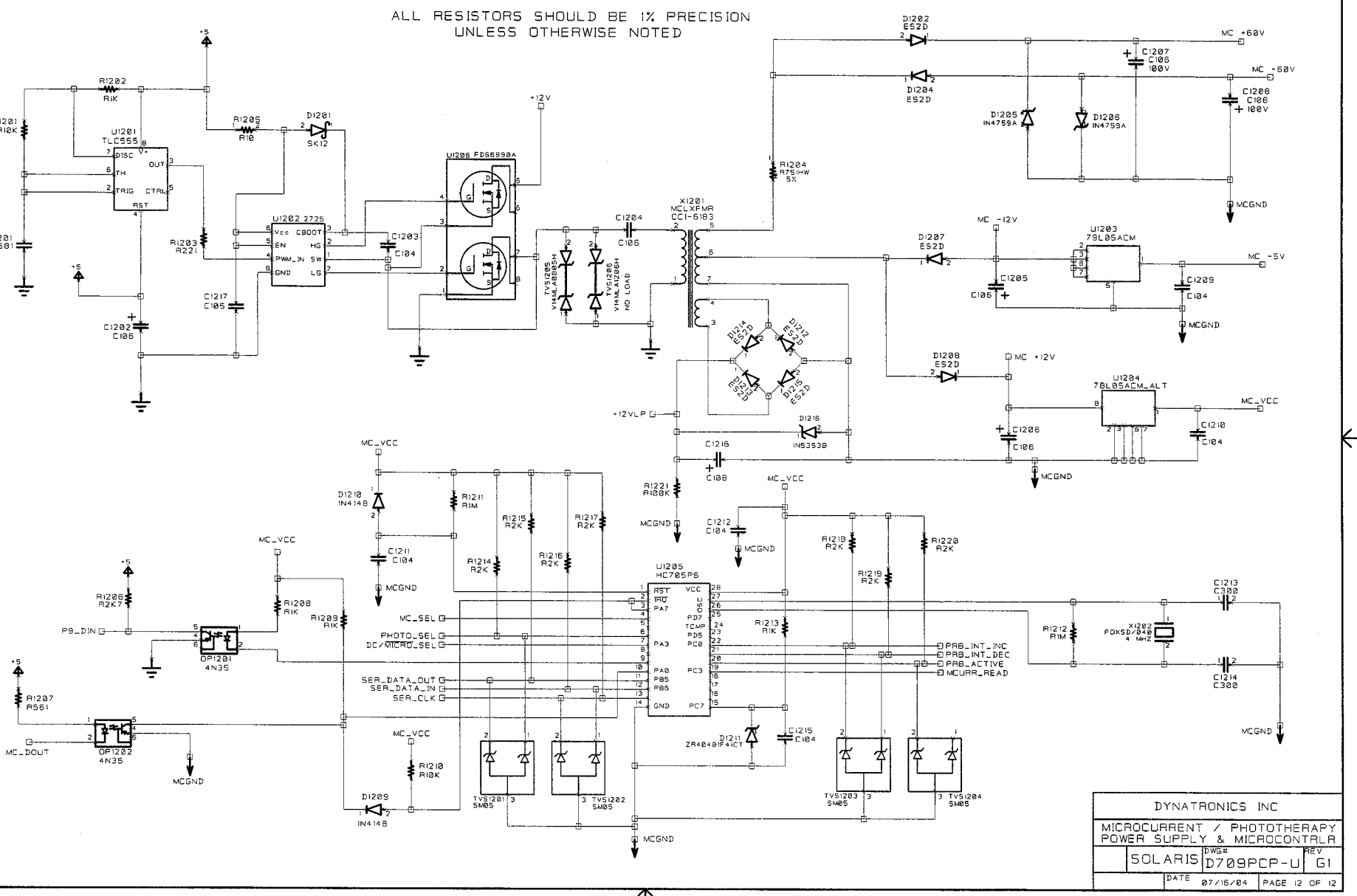

DYNATRONICS INC			
MICROCURRENT / PHOTOTHERAPY POWER SUPPLY & MICROCONTRLR			
SOLARIS	DWG# D709PCP-U	REV G1	
DATE 07/15/04	PAGE 12 OF 12		

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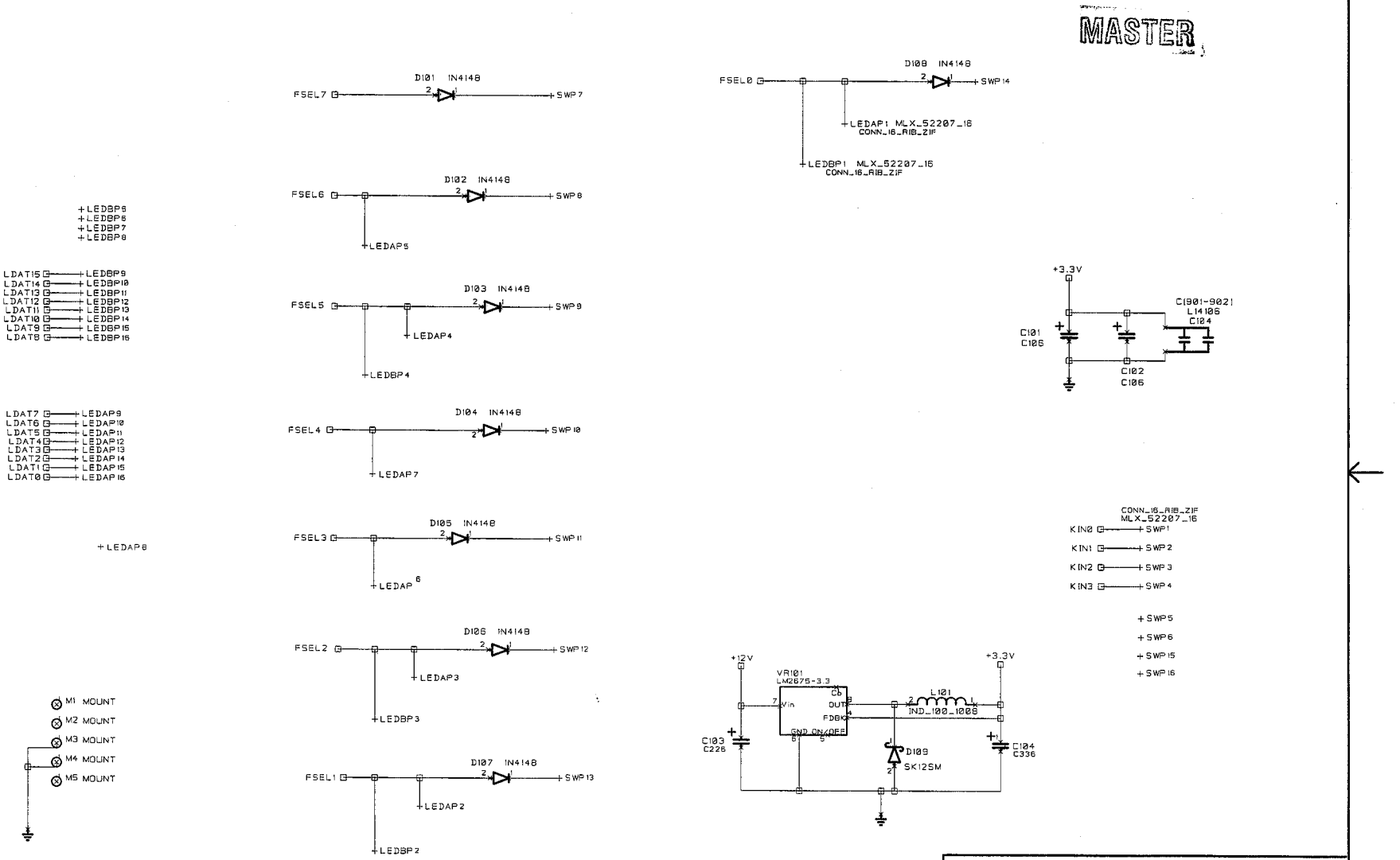
CONFIDENTIAL

MASTER



DYNATRONICS INC				
APPROVALS	INITIAL	DATE	SOLARIS DISPLAY BD	
R&D	BJJ	11/24/03	DRAWN BY BGJ	DWG# D709PCD-SC REV. C1
MGR	RAH	11/24/03		
SERVICE	JR	11/21/03	11/19/03	SHEET 1 OF 3

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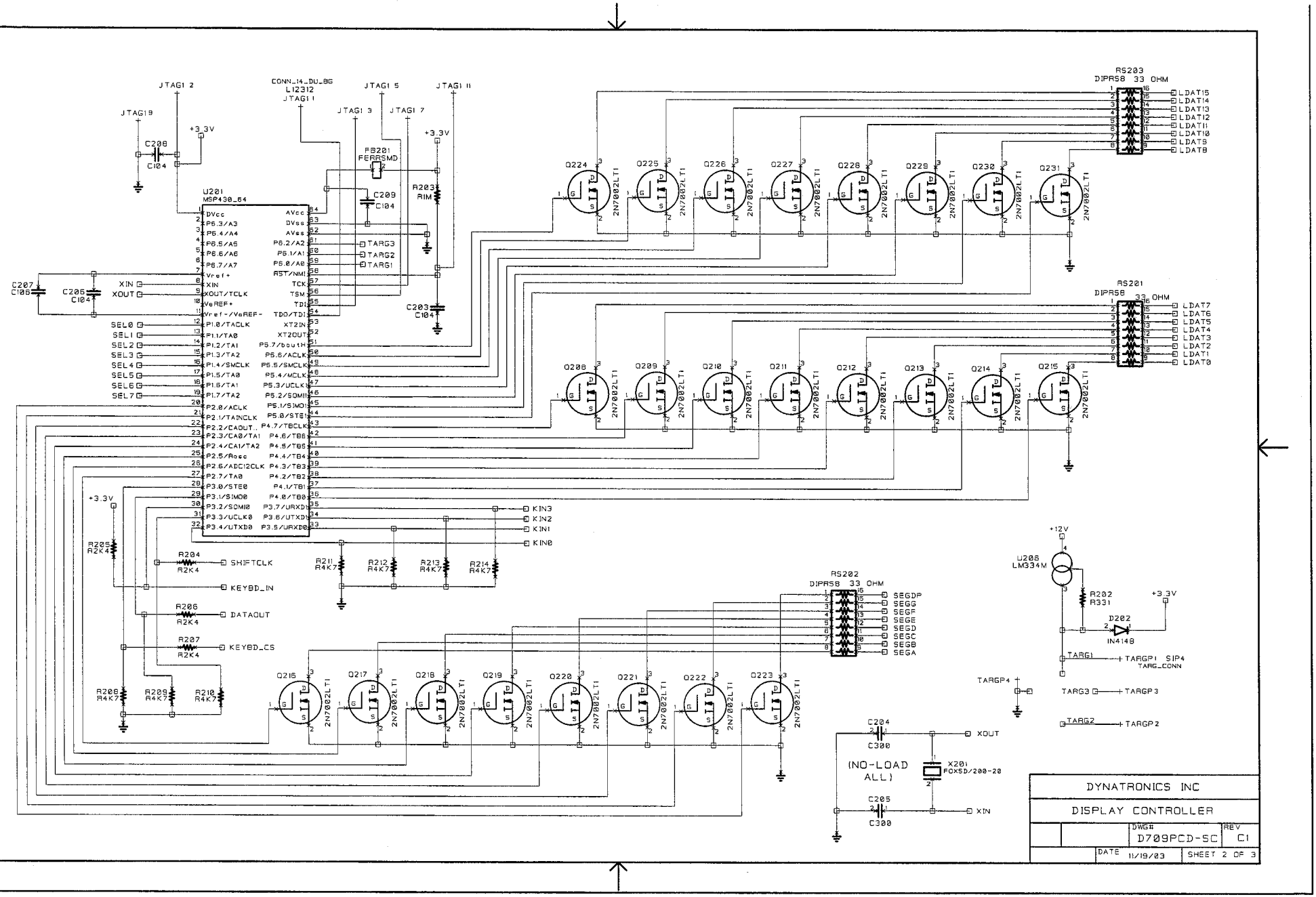
CONFIDENTIAL



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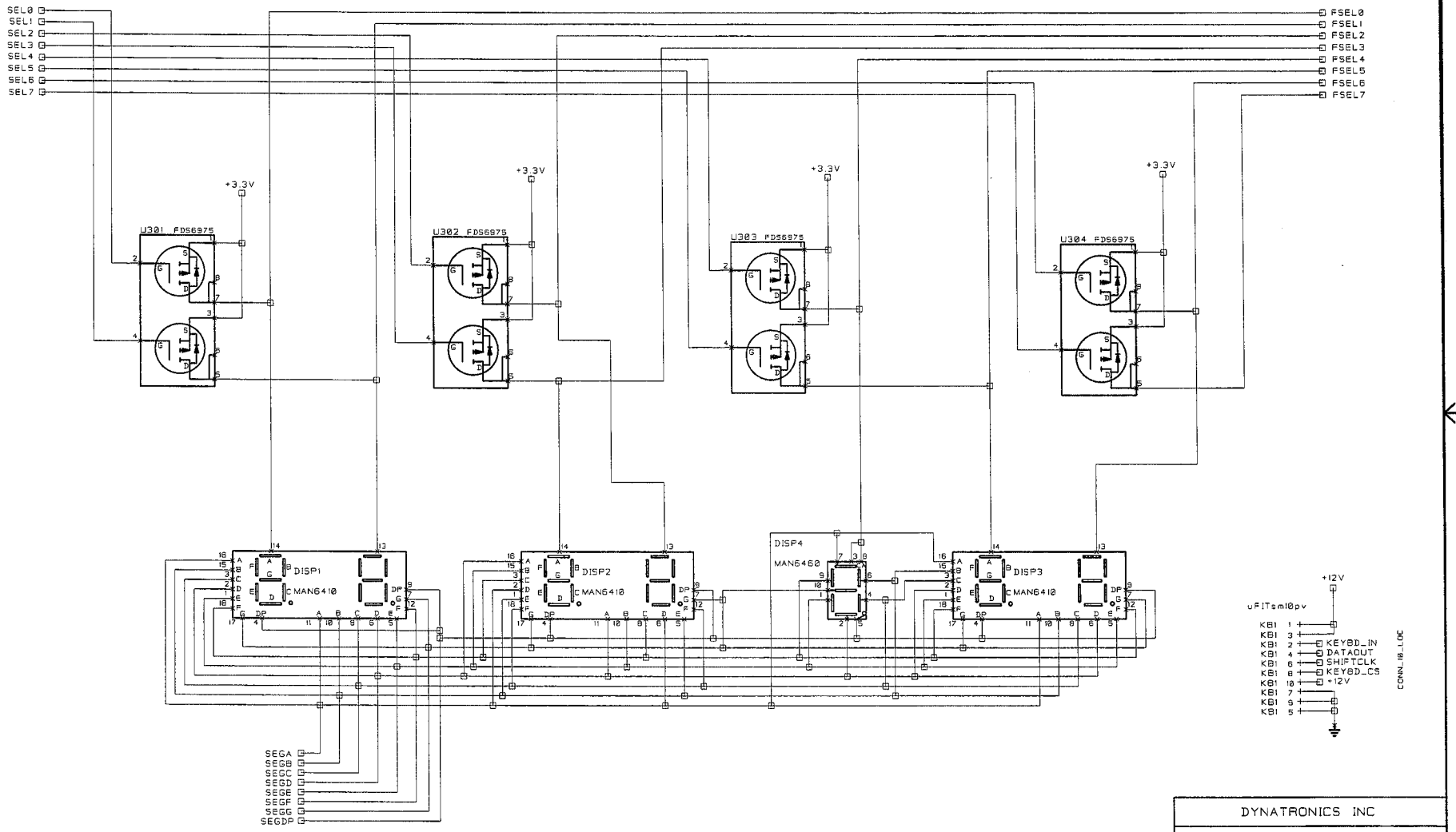

DYNATRONICS INC			
DISPLAY DIGITS			
		DWG# D709PCD-SC	REV C1
	DATE 11/19/03	SHEET 3 OF 3	

CONFIDENTIAL

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DYNATRON® SOLARIS™
Limited Warranty

DYNATRONICS CORPORATION warrants the Dynatron Solaris 701, 705, 706, 708, and 709 products and the applicator soundheads (excluding other accessories) that are purchased with the unit to be free from factory defects in materials and workmanship under normal use for TWO YEARS from the date of purchase by the original owner. Accessories that accompany this product (which are listed as "accessories" on a list included with each unit) are warranted for 90 DAYS. If this product is defective within the warranty period, DYNATRONICS will, subject to the conditions set forth below:

(1) repair or replace defective parts at no charge within a reasonable period of time with new or remanufactured parts, at DYNATRONICS' option; and

(2) provide labor for the repair or replacement of defective parts under this warranty without charge.

Parts used for replacement under this warranty are warranted for the remainder of the original warranty period. THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS SHALL CONSTITUTE THE SOLE AND EXCLUSIVE REMEDY IN THE EVENT OF A BREACH OF WARRANTY.

REGISTRATION REQUIRED. In order for this warranty to be valid, the warranty registration card (included with the product) must be filled out and returned to DYNATRONICS within 30 days of purchase by the original owner. A copy of an invoice or receipt may be requested to verify purchase date.

REPAIRS. All repairs must be performed by an authorized service facility. Any modifications or repairs by unauthorized parties will void this warranty.

OBTAINING WARRANTY SERVICE. Authorization by DYNATRONICS is required before obtaining service under this warranty. Therefore, before shipping or delivering this product to an authorized service facility for warranty service, call DYNATRONICS and obtain a return authorization number.

PACKAGING AND SHIPPING. Any unit shipped to an authorized service facility for service under this warranty must be in the original shipping carton, freight prepaid, fully insured, and properly packed to prevent damage. DYNATRONICS is not liable for any damage to the unit while in transit. Include a summary of the problem with the product. Write the return authorization number obtained from DYNATRONICS on the shipping label.

SHIPPING COSTS. Within the first 30 days of the warranty period, DYNATRONICS will pay all necessary shipping costs associated with obtaining service under this warranty. After the first 30 days of the warranty period, the owner is responsible for all costs associated with shipping the product to an authorized service facility. DYNATRONICS will pay all costs associated with shipping the product back to the owner after service is completed, and will ship the product using the same carrier or type of carrier and service that was used by the owner for the incoming shipment.

EXCLUSIONS. Any defect, malfunction or failure caused by or resulting from improper installation, service, maintenance or repair, or from abuse, neglect, transportation, accident, act of God, or other cause beyond the control of DYNATRONICS will not be covered by this limited warranty. ANY IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF PURCHASE BY THE ORIGINAL OWNER. DYNATRONICS SHALL NOT IN ANY CASE BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL, INDIRECT, OR OTHER SIMILAR DAMAGES ARISING FROM BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, OR ANY OTHER LEGAL THEORY EVEN IF DYNATRONICS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

For more information concerning repairs, operation, or technical assistance, please contact the DYNATRONICS dealer nearest you, or contact DYNATRONICS directly at: the address below.

Dynatronics Corporation
7030 Park Centre Drive • Salt Lake City, Utah 84121 • (801) 568-7000 (800) 874-6251

SOLARIS WARRANTY REGISTRATION

TO REGISTER THE WARRANTY FOR YOUR DYNATRONICS UNIT, REMOVE THIS SELF-MAILER PAGE, COMPLETE ALL INFORMATION REQUESTED, AND MAIL TO DYNATRONICS.
PLEASE TYPE OR PRINT PLAINLY:

Purchase Date_____ Type of Practice _____
(month, day & year required)

Unit Serial No._____ Unit Model Number _____

Soundheads (sizes & Serial Nos.) _____

Practitioner/Contact Name _____

Clinic/Institution Name _____

Address _____

_____ Phone _____

City: _____ State _____ Zip _____

Dynatronics Dealer _____ Salesperson _____

❑ I have read and understand the information contained in the operator's manual for this device.
❑ I have received inservice training from my dealer and/or Dynatronics for this device.

IMPORTANT: If there is anything about the operation or use of your Dynatron device that you do not understand, contact your dealer or Dynatronics for instruction. As a trained medical practitioner, you are solely responsible for determining appropriate application of this device for your patients.

BEFORE RETURNING A UNIT TO DYNATRONICS FOR SERVICE, YOU MUST OBTAIN A RETURN AUTHORIZATION NUMBER. CALL 1-800-874-6251.
-Failure to register the warranty may result in a delay in completion of services, and service will be billable.

How did you hear about the Dynatronics product you just purchased? (Check all that apply)

❑ Advertising	❑ Dealer	❑ Magazine Article
❑ Mail	❑ Trade Show	❑ Other
❑ Referral	❑ Catalog	(Specify)_____

Decision to purchase your equipment was based on? (Check all that apply)

❑ Advertising	❑ Price	❑ Peer Recommendation
❑ Product Literature	❑ Features	❑ Dealer
❑ Company Reputation	❑ Demo	
❑ Other (Specify)_____		

How do you find information about therapy products you want to purchase? (Check all that apply)

❑ Magazines	❑ Other Practitioners	❑ Trade Show
❑ Mail	❑ Dealer	❑ Product Reference
❑ Other (Specify)_____		

For information about therapy products, what magazines do you read? (Please list all that you read)

_____

What features are you most interested in when purchasing equipment? (Check all that apply)

❑ User Friendliness	❑ Accessory Package	❑ Design
❑ Portability	❑ User Programmable	❑ Number of Modalities
❑ Price	❑ ERA	❑ User Modifiable
❑ Unique Features	❑ BNR	❑ Quality
❑ Presets	❑ Soundhead Frequencies	❑ Number of Channels
❑ Safety	❑ UL Listing	❑ Company and Dealer Support
❑ Warranty	❑ Educational Materials	
❑ Other (Specify)_____		

---------- FOLD HERE ----------

RETURN ADDRESS

_____

_____

_____

_____

AFFIX
STAMP
HERE

DYNATRONICS
c/o Customer Service Dept.
7030 Park Centre Drive
Salt Lake City, UT 84121

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